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The purpose of this study was to identify the factors in preschool educational television that engage and sustain children's attention. The method used to measure the children's attention was decided on in a pilot study of three measurement techniques, and consisted of an observer rating scale with the periodic introduction of a kaleidoscopic distractor. There were three groups of children observed: 2- and 3-year-old middle class children, 4- and 5-year-old middle class children, and 4- and 5-year-old Mexican-American children from lower income families. Five television programs for preschool children and one set of animated cartoons were viewed. To check for any possible correlation between language development and attentiveness, the children were given the Peabody Picture Vocabulary Test. The results of the between groups analyses revealed a very high degree of generality in terms of the type of program content that appealed to the age, sex, and social groups studied. Further, there was no correlation between Peabody scores and attention levels, once age was partialled out. Attention level was very low; analysis of the program content showed that children paid greater attention to animated cartoons, introduction to novel objects, and initiation of novel action by the teacher-performer. (MH)

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A COMPARATIVE STUDY OF CURRENT EDUCATIONAL TELEVISION PROGRAMS FOR PRESCHOOL CHILDREN

Edward L. Palmer
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Loyd Inglis

Final Report
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Teaching Research Division
Oregon State System of Higher Education
Monmouth, Oregon

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While this project was initiated through the efforts of Lester F. Beck, so that he rightfully deserves the credit for the early thinking out of which it grew, the authors of this report bear full responsibility for its content. Professor Beck was one of the first to perceive the implications of educational television for the preschool child, and to suggest the urgent need for related research. Except for an unfortunate illness and hospitalization, he would have had the opportunity, through this project, to make his own direct, personal contribution to this body of research.

Many schools and individuals contributed toward the completion of this project. We would particularly like to mention the cooperation of Mr. and Mrs. Kenneth Graham and Mrs. Delores Barrow of the Jack and Jill Nursery Schools, Corvallis; of Mr. Lorenzen and his staff of the Washington Elementary School, Corvallis; and of Mr. Dale Harp and Mrs. Virginia Wales of the Campus Elementary School, Monmouth.

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INTRODUCTION

The primary objective of this study was to identify those factors in preschool educational television programs which engage and sustain the attention of children.

The potential usefulness of broadcast television as a means for providing young children with needed preschool educational experiences, in nursery schools and day-care centers, and in their own homes, has yet to be broadly and systematically explored. In the meantime, a small but gradually increasing number of local school districts are becoming involved in the selection and production of preschool television programs. Furthermore, increased national attention and resources are being allocated to the employment of television for preschool instruction.

Presumably, school officials, who must wrestle with budgets and worry about additional buildings and staff, recognize and appreciate some of the unique advantages of ETV when used to teach preschool children at home. For instance, there is no need to bus little children to and from school; no classrooms are required; no teachers are needed beyond a small studio staff; teaching can be extended down to two-year-olds, and even to one-year-olds advanced enough to watch and listen; mothers can often be enlisted directly as a teacher's aide at home, if desired; and enrollment increases can be handled without additional cost.

The central problems of this study pertained to the factors which make for high or low attentiveness to educational television programs currently being broadcast for preschool children. Do some of these programs interest the target audience more than others, and if so, in what respects? Can specific types of program content with particularly high or particularly low interest be identified? A related concern of the study is that of determining whether certain types of program content are of equal interest to older and younger preschool children, to boys and girls, and to children of different socio-economic or ethnic groups.

One of the chief limitations upon the scope of the study was in its exclusive emphasis upon factors related to attention given to the program. This emphasis derived, at least in part, from the position that high interest was a first and necessary requirement in attempting to achieve educational goals through broadcast television. Unlike the conditions which prevail in the typical classroom, there was no assurance that the members of the intended broadcast audience would be captive, much less captivated. The implications of this fact may be viewed as an asset if the instructional medium is thereby constrained to employ attractive and enjoyable program content.

Before proceeding to the next section, a few words about the methodological approach are in order. One strategy of the study was to acquire information about fluctuations in attention and to attempt subsequently, from an *ex post facto* basis, to discover the types of program content which may have given rise to these fluctuations. While there were certain advantages to this approach, there were also potential disadvantages, which should be borne in mind when interpreting the results. The chief advantage lay, first, in the possibility of providing a broadly varied range of tentative information for the interim use of those involved in the selection and production of preschool television programs, and, secondly, in the possibility that this information would lead to fruitful hypotheses for further research and development.

The potential disadvantages become real disadvantages only if one were to commit the classical errors so often associated with *post facto* interpretations.

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In terms of the present study, of assuming that certain fluctuations in interest, which appear associated with specific program characteristics, are in fact caused by those program characteristics.

PHASE I: METHODS TO MEASURE VIEWING ATTENTION

The first problem of the study was to develop suitable measures of television-viewing attention. This section describes a separate phase of research which was undertaken for this purpose.

A method of observation was required which fulfilled the following criteria:

1. It must not require cooperative behavior which is beyond the ability of two-year-olds.
2. It must be applicable to children between the ages of two and five.
3. It should be as valid and reliable as possible.
4. It must permit the measurement of fluctuations in attention over the course of a single program.
5. It must provide a record of the verbal and motoric behaviors of the viewers in response to the program.

The following review will show that because of these requirements, none of the methods previously employed for measuring television-viewing behavior could be readily adapted, in any reasonably intact form, for use in this study.

BACKGROUND OF RELATED RESEARCH

Becker and Wolfe (1960) reported that one of the standard practices in educational broadcasting had been the evaluation of children's programs solely on the basis of adult reactions. Accordingly, they explored the extent to which members of two different groups of adults could predict children's interest in a television program. They showed programs independently to mothers, to experts in preschool education, to children of eleven to twelve years of age, and to four- and five-year olds. Patterns of predicted interest were elicited from both adult groups, and compared with judges' observational ratings of the children's interest. The authors reported the following conclusions:

> "Neither educators trained for preschool or kindergarten work nor mothers of preschool children seem able to predict, with any high degree of reliability, the interest reactions of youngsters. We would hypothesize on the basis of the limited evidence in this study that the ability of adults to predict the interest of children ... decreases with the decreasing age of the children." (Becker and Wolfe, 1960, pp. 212-213).

If these tentative conclusions were correct, then there was clearly a need for detailed, objective information concerning the types of program content capable of capturing and sustaining the attention and interest of young children. However, due to the nature of the observational method, there was good reason to question the reliability of Becker and Wolfe's results. They placed observers in a room with groups of four or five children. The observers made periodic subjective judgments as to the level of interest being exhibited by each child. The extent of agreement between the observers was not reported. It is possible that it was quite low, or even that there was no agreement at all. In addition to the questionable level of reliability, there was also some question as to the validity of the method. The observers were all given a list of criteria by which to gauge interest, but there was no record of the actual types of behavior which a given observer took to be indicators of high or low interest. Accordingly, there was no assurance that these behaviors, whatever they may have been, were in fact related to interest. An additional problem of interpretation lay in the unknown extent to which the presence of an adult observer may have affected the behaviors being observed.

In the same study (Becker and Wolfe, 1960), an additional technique for measuring TV-viewing interest was explored. Children as young as fifth graders were used as subjects. The first technique was a paper-and-pencil approach, wherein each viewer periodically checked either an "interest" or a "disinterest" category. The second was a push-button method. In this approach, the viewer pressed a button to indicate interest and released it to indicate disinterest (under one condition), or released the button to show interest and depressed it to show disinterest (under a second condition). These methods were considered here to be unsuitable for use with children five years of age and younger, such as were to be involved in the present study.

A relatively sophisticated observational approach was employed by Guba and Wolf (1964) in studying television scanning behavior among children. The subjects were fifth graders, who wore specially constructed helmets while viewing television programs. An apparatus attached to these helmets made it possible to reflect a beam of light from the cornea of the child's eye onto a permanent motion-picture record for later analysis. By coordinating these records of eye movement with the content of the television program, Guba and Wolf were able to identify, at least tentatively, certain elements of the visual display which were rather consistently scanned. Among the fifth-grade subjects of the study, these elements were reported to include, notably, the face of the narrator, the narrator's hands (but only at those times when an object was being manipulated), and objects toward which the narrator directed the viewers' attention.

One of the most desirable features of the above approach, with its focus upon scanning behavior rather than gross attentiveness, was its capacity for isolating specific elements of the visual display toward which the viewer's eyes were directed. However, with younger children, the wearing of "space helmets" would require lengthy adaptation procedures.

At least two studies reported using a measure of attention based upon the number of eyes that were turned toward the screen at any given time. Bridges (1960) rated the attention of 747 elementary children in viewing groups which contained approximately seventy pupils each. At five-minute intervals throughout a thirty-minute program, teacher-observers simply counted the number of pupils who were either watching or not watching the screen. A more refined version of the same technique was used by Burns and Smith (1966) in a study of fifth graders. Using time-lapse photography, they took one picture every ten seconds, where each such picture showed both the faces of the viewers and a TV monitor. Attention was defined in terms of the number of eyes turned toward the television in any given photograph. The major problems with this method are associated with the use of groups of children rather than individuals. Group viewing behavior differs substantially from individual viewing. This point will be discussed later.

Finally, Kretsinger investigated the use of restiveness, in the form of gross bodily movements, as an index of interest and attention among preschool ETV audiences. An obvious problem with this approach was its failure to distinguish bodily movements which may have been elicited by boredom, or by the presence of distractions, from those which may have been elicited by interest in the program. The approach treats both as signs of inattentiveness.

Of the various approaches reviewed above, that devised by Burns and Smith (1966), making use of photography, was clearly the most nearly suited to the needs of this study. It was a technique which could be used with children across a wide age range, which would very likely be acceptable in terms of its reliability, and which was applicable with moderately large viewing groups. The use of the technique also would make it possible to observe fluctuations in attention over the course of a given program. A requirement of this study which was not met by the Burns and Smith approach, however, was that of providing for a permanent record of the verbal and motoric behaviors of the viewers.

PILOT INVESTIGATIONS

A. The Use of Group Viewing Conditions in the Measurement of Attention.

Because observation under group viewing conditions tends to be more efficient than observation under individual viewing conditions, the former approach was initially proposed for use in this study. In a pilot investigation of observation under group viewing conditions, groups of four preschool children were shown pairs of program simultaneously. Periodic "head and eye counts" were made, yielding data on the number of children who were watching each program during a particular observational period. The prospective advantages of this approach were, first, its efficiency, in that moderately large groups of children could be observed simultaneously; and, secondly, the direct evidence it provided concerning specific viewing preferences. However, these potential advantages were far outweighed by the disadvantages that were found to be associated with the technique. Among its disadvantages were the following:

(1) Any time one child influenced the viewing behavior of another, as frequently occurred, the desired condition of independent measurement was violated,

(2) the child viewed in the company of his peers, so that the group viewing situation deviated from the typical home situation, to which generalizations were to be made,

(3) the sound from each program interfered with that from the other,

(4) each child tended to watch the program nearer to himself irrespective of content,

(5) it was impossible to tell whether a tendency to watch a given program segment was due to the presence of more interesting factors in that program, due to less interesting factors in the other, or due to a combination of both,

(6) as group size was increased, the amount of detailed information which a single observer could record on each viewer decreased rapidly, and

(7) children continually influenced the viewing behavior of their peers, e.g., distracting or pointing to a program.

Clearly, most of the above disadvantages would hold for any situation involving direct observation under group viewing conditions, and not only for the type in which pairs of programs are presented simultaneously. Several small groups of kindergarten children viewed a single television program. Their behavior was recorded on video tape which was then replayed until the behavior of each individual child was analyzed. It was concluded that the influence of each group leader was a confounding factor which was often far more influential in the attentiveness - or non-attentiveness- of the other children than the actual television program itself. Accordingly the project staff decided to abandon the more efficient approach of group observation, and to devise an acceptable method of direct observation under individual viewing conditions. The immediately following sections describe a preliminary study in which three such methods of individual observation were developed and evaluated.

B. The Use of Individual Viewing Conditions in the Measurement of Attention: A Comparison of Three Methods.

This section will describe a preliminary study in which three methods of observation, under individual viewing conditions, were developed, applied, and evaluated. Briefly overviewed, the first method involved the development of a behavioral rating scale, on which detailed descriptions of the visual, verbal and motor behaviors of the viewer were recorded. The second and third were, in a sense, elaborations of the first, in that the same behavioral rating scale was used. However, in the second, a specially constructed distractor was periodically introduced into the viewing situation, presuming that attentiveness was inversely related to distractability. In the third method, the visual and auditory portions of the program were periodically distorted, but could be brought back to normal by a button-pressing response on the part of the viewer. Button-pressing latency was recorded, on the assumption that greater latency denoted less attentiveness. Thus, the three observational methods were:

1. Rating Scale
2. Rating Scale and Distractor
3. Button Press Latency

A more detailed treatment of the rationale associated with each of these methods will be presented in the sections which follow.

METHODS AND PROCEDURES

The Simulated Television Set. Common to all three experimental methods of observation was a simulated television set. The simulated television made it possible to show a kinescope of a given television program repeatedly, with the use of a 16 mm. sound, motion-picture projector. The projector, modified for rear-screen projection, was mounted to the rear of any empty console-type television cabinet. A rear-projector screen occupied the standard 21-inch opening originally occupied by the picture tube. Additional features were the use of the cabinet's original off-on and volume-control switches for the purpose of operating the projector, and the use of a special housing which was constructed in the manner shown in Figure 1, extending backward from the back of the television cabinet, so as to partially enclose the projector. One purpose of this housing was to block the child's view of the projector. In addition, by lining the housing with sound-insulating material, it was possible to reduce the potentially distracting effect of the machine noise. From the child's point of view, the effect was virtually identical to that of viewing television.

Method I: The Behavior Rating Scale. The first of the three experimental methods of observation involved a behavior rating scale, designed for use by an individual rater observing an individual child. Numerous trials and revisions yielded a detailed set of specific behavioral categories and a standard rating interval. The scale was expressly designed for use in rating an individual child at periodic intervals as he was viewing a program on the simulated television set. The standard rating cycle adopted for the purposes of this study required a total period of thirty seconds. It allowed for observing the child's behavior during the last five seconds of each thirty-second interval, and for recording the observed behavior during the remaining twenty-five seconds. This was found to be about the briefest cycle with which an observer could work comfortably over an extended period of time.

Three main categories of behavior were included in the scale. These included visual, verbal and motor behaviors. All behaviors were observed, simultaneously, then recorded under the appropriate categories and sub-categories.

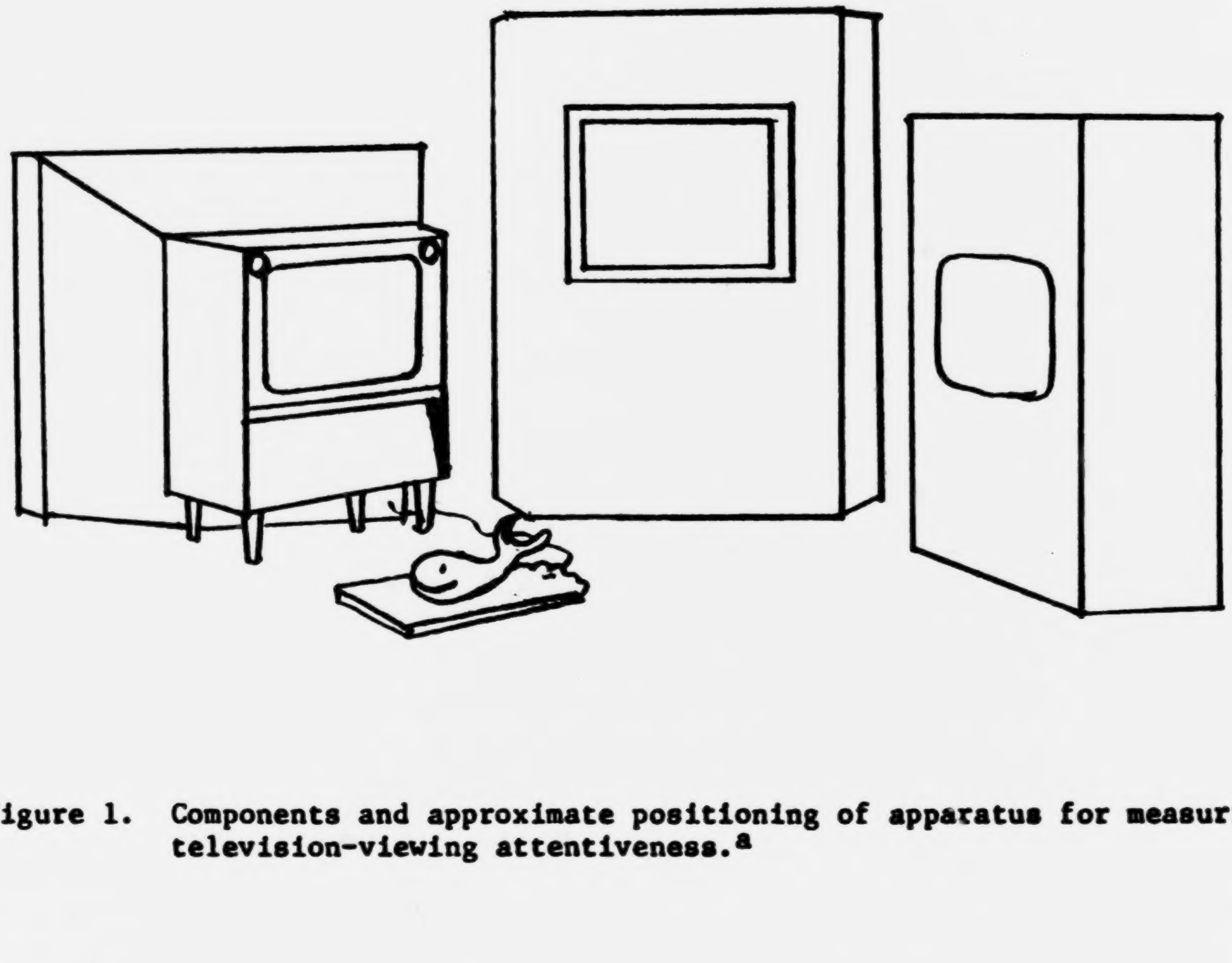

Figure 1. Components and approximate positioning of apparatus for measuring television-viewing attentiveness.[a]

[a] Simulated television set is on left. An extension to the television cabinet housed a 16 mm. rear-screen motion-picture projector. This housing served to screen the projector and the projector noise from the viewer. In the center is a portable observation booth, with one-way glass. On the right is a housing for a rear-projection screen, upon which a distracting kaleidoscope image was periodically projected. The toy whale represents one experimental form of "on-off" switch.

The rating of visual attention consisted of recording the successive objects toward which the individual turned his eyes during each five-second interval. A simple, arbitrary code was used in order to record such objects of visual attention as (1) the simulated television set; (2) a particular distractor (e.g., the distractor to be described in the next section), or (3) any other object. The rating of verbal behavior consisted of noting the occasions during a given five-second observation period when a child spoke or made any other vocal sound. When possible, the nature of the vocalization (e.g., either the exact words, or a description of the sound) was recorded. The third observational category included various motor behaviors. Figure 2 summarizes not only the categories of motor behavior which were observed and recorded, but the categories of visual and verbal behavior as well.

Not all of the motor behaviors of Figure 2 were mutually exclusive. For example, all combinations of rhythmic, imitative, and teacher-directed behavior were possible, and many of these combinations actually occurred. In scoring these three particular forms of behavior, a code system of binary conditions was employed. Thus, the code "111" indicated that an instance of behavior which was rhythmic, imitative and teacher-directed had been observed; the code entry "011" indicated that an instance of non-rhythmic, imitative, teacher-directed behavior had occurred; "100" indicated an instance of behavior which was rhythmic, non-imitative and non-teacher-directed; etc.

A standard scoring sheet was designed for the purpose of keeping a response record on each viewer. This scoring sheet provided spaces in which to record visual, verbal, and motor behavior. Such a set of spaces was provided for each five-second observation period throughout the course of a given program. A space was also provided for additional comments by the observer.

Categories of Behavior	Sub-Categories of Behavior	Examples
I. Visual	A. Eyes on TV.	Child looked only at TV during five-second observation period.
	B. Vacillation between TV, standard distractor, and other objects.	
	C. Eyes away from TV.	Child did not look at TV during five-second observation period.
II. Verbal	A. No verbalization.	
	B. Verbalization related to program.	Answered performer; squealed when excited.
	C. Verbalization unrelated to program.	Talked, sang; called for assistant.
III. Motor	A. Elicited by the program.	
	1. Rhythmic	Clapped or bounced with music; marched.
	2. Imitative	Imitated teacher, puppet, animal, car.
	3. Teacher-directed	Responded as directed by the teacher-performer.
	4. Anticipatory	Cringed at approaching catastrophe.
	5. Perseveratory	Continued with previous activity after a new activity had begun.
	6. Non-verbal emotive	Smiled, cringed.
	B. Not elicited by the program.	
	1. Purposive, but still visually attentive	Adjusted belt, scratched.
	2. Purposive not visually attentive	Explored room or other objects in it.
	3. Non-purposive but still visually attentive	Wiggled; tapped.

Figure 2. Categories of Behavior Recorded by Observers.

Name ______________________ Age ________________ Source ____________________

ETV Program __________________ Date ________________ Observer __________________

Observation Interval	Vision	Verbal	Motor	Description of Behavior	Other	
1						1
2						2
3						3
4						4
5						5
6						6
7						7
8						8
9						9
10						10
11						11
12						12
13						13
14						14
15						15
16						16
17						17
18						18

Method II: The Periodic Introduction of a Distractor. The second of the three observational methods consisted of the periodic introduction of a potentially distracting visual event. This event could be introduced into the child's peripheral view, or removed, at any time while a program was being presented on the simulated television set. For the purpose of this study, it was introduced during the last five seconds of each thirty-second interval. Underlying the use of this method was the assumption that the lower the strength of the individual's attentiveness to the program, the more responsive he would be to distractions.

A number of considerations entered into the problem of devising a suitable distractor. First, the use of toys was ruled out by the possibility that a given toy would be more attractive and hence more of a distraction to children of one age or socio-economic level than to those of another. Individual familiarity and preference appeared a source of confounding. It was assumed that greater and more sustained distracting power would result from using a colorful rather than an achromatic event, and from using a moving rather than a static device. The device which was designed to serve as a distractor met both of these conditions, while also presumably avoiding the problem of differential appeal across age or socio-economic levels. It consisted of a continuous loop of 16 mm. silent motion-picture film which periodically displayed a colorful, constantly changing kaleidoscopic pattern. This film was made by mounting a toy kaleidoscope onto a 16 mm. motion-picture camera, and panning slowly over an array of colorful bits of paper. In order to display this film to the viewers, it was projected by a 16 mm. projector onto a rear-projection screen which was mounted in a portable booth. The size and shape of the screen were those of a standard, twenty-one inch television screen. The portable booth, shown in Figure 1, above, was designed to screen the projection apparatus from the viewer.

Pilot tests showed the distractor to be a relatively powerful attention stimulus with small children (and staff). For the purposes of this study, the introduction and removal of the kaleidoscopic image was under the control of an automatic, fixed-interval electric timer. A detailed diagram of the timing circuitry, as well as the circuitry for related apparatus, some of which is yet to be described, is shown in Appendix B. The timing device was preset to turn on the projection lamp for the last five seconds of every thirty-second interval. The projector motor ran continuously, and only the projection lamp controlled the intermittent presentation of the distractor, so machine noise associated with the projector was kept constant.

Presumably, with this type of distractor, there would be no differential appeal across age or socio-economic levels, as with the use of toys. An additional advantage of this method lay in the fact that the distractor could be manipulated freely and instantaneously by the experimenter. Moreover, after the distractor was introduced, it could be removed from the child's view without causing him to feel upset or deprived. These features made it possible to introduce or to remove the distractor at any pre-determined instant during the program, and thereby to derive strictly comparable data from viewer to viewer as to the relative appeal of a given program segment or the distractor.

Method III: The Measurement of Button-Pressing Latency. The third method devised for measuring the attentiveness of the children was designed on the basis of a rationale which can best be described in terms of the apparatus itself. Very briefly, this apparatus functioned to dim both the illumination level of the picture and the volume of the sound being presented on the simulated television set. At the end of each fifteen-second interval, the sound and illumination levels were simultaneously diminished, until only a vague picture was seen, and the sound was only faintly audible. The exact electronic components used in achieving these effects are shown in the diagram of Appendix B. The child was provided with a cylindrical switch, about four inches long and a half inch in diameter, which he could press in order to restore the initial levels of volume and illumination. A chart recorder, also described in Appendix B, recorded the interval between the onset of the dimming and the time when the child pressed the button. Thus, the latency of the viewer's button-pressing response was recorded.

The dimming was automatically timed to occur every fifteen seconds. However, if the viewer failed to press the button during any given fifteen-second interval, the light and sound were automatically restored to their normal, initial levels. Then, after fifteen additional seconds, the dimming again occurred, and the viewer would again restore the normal levels of light and sound by pressing the button, or, in the event of his failure to do so, they were again automatically restored after fifteen seconds.

A further precaution was taken against the possibility of constant button pressing on the part of a viewer in an attempt to maintain the normal levels of light and sound. Any time the child already had the button pressed down when the dimming occurred, it was necessary for him first to release and then to re-press the button in order to restore the normal levels.

The use of this apparatus proceeded from the following assumptions: (1) the greater the individual's degree of attentiveness to the program, the more aversive the dimming effect will be; and (2) the more aversive the dimming effect, the shorter will be the interval between its onset and the pressing of the button. In short, this rationale holds that strength of attentiveness is inversely related to button-pressing latency.

Subjects. The Subjects (Ss) for this phase of research included 33 kindergartners and 13 first-graders. The mean CA of the combined group of 46 Ss was 5-9. Each S was randomly assigned to membership to one of three groups, which corresponded to the three methods of observation described above. These Ss were selected at random from the kindergarten and first-grade enrollments of a school which serves predominantly middle-class and some lower-class families.

Procedures. The members of all three groups were observed through the use of the observation scale which was described earlier. For Group I, this was the only observational procedure employed. For each member of Group II, the observation scale was used in conjunction with the kaleidoscopic distractor. For each S in Group III, the observation scale was used along with the apparatus for recording button-pressing latency. Groups I, II, and III contained 11, 16 and 8 Ss respectively. While membership in each group was determined by a random process the sizes of the groups differed because of attrition due to absences.

In order to establish rapport with the Ss, and to familiarize them with the surroundings in which they were to be observed, the members of all three groups were taken as a group to the observation room, where they viewed a children's motion picture on the simulated television set. This motion picture was selected as unrelated to that which they were later exposed for experimental purposes. Later, the Ss were brought to the observation room individually, where each viewed the same kinescope of a fifteen-minute children's educational television program. Insofar as it was possible, given that there were unequal numbers of Ss in the three groups, the Ss were selected for observation according to a pattern of single alternation. The purpose was to control for any possible differential in attentiveness from one group to the next due to the time of day.

One wall of the observation room was lined with windows containing one-way vision glass. However, none of the children was informed of the fact that he was being observed. Aside from the simulated television set and the apparatus for showing the kaleidoscopic distractor, the room was without pictures, or other potentially distracting objects or decorations.

In the procedure for Group I, each child was taken into the observation room, and asked to sit on a small (approximately 3' x 3') square rug, which was placed in such a manner that the child was sitting approximately four to five feet away from and facing the simulated TV set. The child was told that the reason for leaving his class was "to watch TV". After he had taken a sitting position on the rug, the simulated television set was turned on. About a minute later, the adult said he was going to go do some work in the next room, and left the child alone to watch the program. Only very rarely did a child require further attention prior to the end of the program. The observer was situated on the opposite side of the one-way vision screen, in a position above, behind, and slightly to the side of the simulated TV set. From this vantage point, it was possible for the observer to determine whether the Ss' eyes were directed toward the set or away. Observations of the Ss' behavior were taken during the last five seconds of each thirty-second interval throughout the period of time during which the program was shown. A timing device, which is shown in the diagram of Appendix B, turned on a small, fifteen-watt incandescent "timing" light.

The observer was able to focus his vision centrally upon the behavior of the S while at the same time attending peripherally to the timing light, which was his cue for beginning and ending each observation period. During the twenty-five second period following observations, the observer recorded the child's visual, verbal, and motor behavior on the experimental rating scale described earlier.

The procedures and conditions for Group II were essentially the same as those for Group I, with one main exception. This exception consisted of the periodic introduction of the kal doscopic distractor. The projection lamp which caused the distractor to appear and disappear was activated by the same switching and timing device which operated the above-described observer's timing light. Accordingly, the distractor came on for the entire duration of each five-second observation period, and was off during the twenty-five second intervals which separated these periods. As the S̲ was being seated on the rug in front of the simulated television set, and as the distractor appeared and disappeared, he was simply told, "This (pointing to the distractor) will come on and go off from time to time."

The procedures and conditions for the members of Group III were also similar to those for Group I, except that periodically (every 15 seconds), the volume of the sound and the illumination of the picture were simultaneously reduced. The apparatus used in achieving this effect was described earlier. During the first part of the program, the child was shown how to use the push-button in order to restore the light and sound to their normal levels. He was then left alone in the room to view the remainder of the program. None of the children exhibited any difficulty in learning to use the push-button for its intended purpose.

The timing of the observation periods was such that each S̲ in each of the three experimental groups was observed while viewing the same five-second segments of program content. This was achieved by setting the timing apparatus in the same start position prior to each showing, by placing the same frame of the kinescope over the projector aperture at the beginning of each showing, and by starting the projector and the timer with a single switch.

Scoring. For the scoring of visual behavior, if a given S had his eyes on the set during all of a five-second observation interval, he was assigned a score of one; if he was vacillating between the program and any place other than the program, a score of two; and if on the distractor or anywhere else other than on the program, a three. Thus, lower scores represented higher attentiveness, and higher scores, lower attentiveness. For purposes of exploration, the rank-order data so derived were treated with statistics appropriate for interval-level data. A visual attentiveness score was recorded for each individual for each observation period throughout the course of the fifteen-minute program. Motor and visual behavior were also recorded for each observation period, following the categories of the previously described observation scale.

In the scoring of button-pressing latency, it was necessary to convert distances between points, which had been automatically recorded on the tape of a chart recorder, into units of latency. In this case, it was convenient to assign a score of 1 to a latency of .750 seconds or less, a score of 2 to the next interval of .375 seconds, and so on, up to a score of 7 for a latency greater than 2.625 seconds.

DATA AND ANALYSIS

PHASE I: THE MEASUREMENT OF VIEWING ATTENTION

Viewing attentiveness was assessed by three methods:

1) Group I, in which children were observed and their overt behavior noted on a specially devised behavior rating scale as they watched an ETV program individually,
2) Group II, in which the children were observed as in Group I, but in which the distractor was utilized at periodic intervals in the ETV program; and
3) Group III, in which attentiveness was measured by timed latency to press a button to restore the light and sound of an ETV program which was periodically dimmed.

Results from Groups I and II were compared to determine the effectiveness of the distractor, and also to assess whether effectiveness was sustained or diminished over a period of time.

Results from Groups I, II, and III were then compared to assess the efficacy of the button pressing method.

The three observational methods were then evaluated to determine which one could most effectively be used for Phase II of the study in which the fluctuations in attention of preschool children watching ETV programs were described.

Comparison of Group I and Group II

Group I contained 11 Ss, each of whom was observed 25 times, yielding 275 observation periods in all. During 86 percent of these periods, the Ss' eyes were on the program for the entire five-second period. During the remaining 14 percent of the periods, their eyes were turned away from the program during all or some part of the period. By contrast, during the

400 observation periods for the 16 Ss of Group II, Ss' eyes were turned exclusively toward the program for 57 percent of the observation periods, and away from the program for all or part of the remaining 43 percent of them. The Ss in Group II, who were exposed to the distractor, thus turned their eyes away from the program 29 percent more frequently than the Ss in Group I, who were not exposed to the distractor.

The above results indicated clearly that the distractor worked, as intended, to increase the number of times the Ss' eyes left the program. Further evidence that the distractor worked as intended may be seen in a comparison of the means and the ranges of the visual attentiveness scores for Groups I and II.

Table 1. Comparison of Groups I and II

	Visual Attention Scores		Percentage of S's Visually Attentive to ETV Program	
	Range	M	Visually Attentive	Partially or Completely Inattentive
Group I (observation only)	26 - 35	29.25	86%	14%
Group II (observation plus distractor)	36 - 62	46.10	57%	43%

The possible range of total scores on the measure of visual attention, derived by summing any given *S*'s visual attentiveness scores over the 25 observation periods, is 25 through 75. The average scores for Group I was 29.25, with a range from 26 through 35. For Group II, the mean score was 46.10, and the range 36 through 62. Notice that the obtained ranges for the two groups did not overlap. The higher mean score for Group II, the Group exposed to the distractor, indicated a lower level of attention to the program. Notice also that the mean score of 46.10, obtained with Group II, was much nearer the middle of the possible range than was the mean score of 29.25, obtained with Group I. The latter fell very near the greatest possible average attention level of 25. Therefore, with the use of the distractor, attention scores were free to vary normally over a wide range, whereas without the use of the distractor, the attention scores approached the maximum possible level, and so were not free to vary more than a very limited amount in the direction of greater attention.

The data were further analyzed in order to determine whether the effectiveness of the distractor was sustained over the course of the 25 observation periods (or the total period of approximately 12.5 minutes) during which it was presented. One way to express the extent to which the distractor continued to function in the intended manner was to compare the percentage of times that the *Ss* of Groups I and II were distracted during the last five observation periods. For Group I (no distractor), 9 percent of the time the *Ss* were distracted during all or part of the last five observation periods, whereas for Group II, the figure was 56 percent. It was very clear that the distractor retained the ability to distract, even after it had already been introduced 20 or more times.

The results for Group III, based upon the measurement of button-pressing latency, indicated a mean latency, taken over 25 observations upon each of 8 Ss, of approximately 0.9 seconds. No S ever responded in less than 0.75 seconds, and only rarely in more than 1.5.

Because the members of all three experimental groups were observed during identical five-second intervals throughout the course of the same program, it was reasonable to compare the patterns of fluctuation from group to group. These comparisons were relevant in evaluating the construct validity of the various measures. Table I shows the correlations among the three groups, based upon the patterns of flunctuation in visual attention for Groups I and II, and upon the flunctuations in button-pressing latency for Group III. These correlations were based upon the fluctuations in mean scores across the 25 observation periods for each group. Neither

TABLE 2. CORRELATIONS BETWEEN SCORES FOR GROUPS I, II, AND III.

	Group I	Group II	Group III
Group I	-	.59*	.16
Group II		-	.16
Group III			-

the correlation between Groups I and III nor that between Groups II and III was significant at the $p<.05$ level. The correlation between Groups I and II was significant ($p<.05$).

The theoretical position that button-pressing latency and resistance to distraction were both measures of attention, and that they should therefore be correlated, was not supported by these results. Accordingly, it was necessary to determine which of the two types of measurement, if either, was an acceptable measure of attention for the purposes of Phase II. Before turning to an evaluation of their acceptability, it should be said that there was no useful way to correlate the additional data relating to verbal and motor behavior with the data on visual attention or button-pressing latency. For that reason, further discussion concerning the usefulness of the data from the verbal and motor categories of the observation scale will be postponed until later in this report.

Evaluation of the Three Observational Methods. The superiority of the method for measuring visual attention which made use of the distractor over the similar method which did not do so was pointed out early in the preceding section. It remained, then, to determine whether the measurement of visual attention was more or less acceptable than the button-pressing method, and whether either was acceptable for the purposes of Phase II. The consensus of the four authors was that the use of the visual category from the rating scale taken along with the periodic introduction of the distractor was a more acceptable method. One basis for this for this decision was the face validity of the method involving the use of the distractor. The theoretical relationship between button-pressing latency and strength of visual attentiveness required more assumptions than the relationship between visual distractability and strength of visual attentiveness. In addition, the procedure of observing and recording visual behavior provided the investigators with a greater opportunity to gain direct observational impressions concerning the relationship between attention and program content than did the button-pressing approach. The button pressing apparatus introduced new sources of variance:

1. Some children were intrigued by the button. They played with it before the program started it, attempted to swallow it during the program, etc..
2. Children occasionally lost their button, and would fumble for it before pressing,
3. Viewing behavior, measured as intense by the observational scale, was sometimes accompanied by long latencies. Observers conjectured that high interest sometimes interfered with quick button-pressing.

The unvalidated impression of the observers was that the distractability of the Ss was linked in a systematic fashion to the program content. The results of Phase II will be relevant in evaluating the validity of this impression.

PHASE II: THE RELATIONSHIP OF SUBJECT VARIABLES AND PROGRAM CONTENT TO ATTENTION

The research of Phase II was largely descriptive in character. Its major purpose was to describe the fluctuations in attention which occurred when preschool children from various groups were exposed to various types of program content. Hopefully, *post facto* interpretations of these fluctuations in relation to the types of program content which produced them would lead to a number of tentative but practical recommendations for producers, and to fruitful hypotheses for further research.

This phase of research explored patterns of attention in relation to

1. subject variables, such as age, sex, socio-economic and ethnic status, and amount of receptive English vocabulary;
2. interaction between subject and program variables, such as what general types of programs might appeal differentially to two-year-olds or to five-year-olds, to boys or to girls, or to middle-class English-speaking or to lower-class Spanish-speaking preschoolers;
3. program content variables, such as style of teaching and an attempt to explore content of portions of programs which tended to result in high visual attention of all groups observed.

Methods and Procedures

Subjects. The Subjects (*S*s) of this phase included six four-year-old and six five-year-old Mexican-American (M-A) children, and six each of two-year-old, three-year-old, four-year-old and five-year-old Middle-Class (M-C)

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children who were not of Mexican-American origin. Each of these sets of six children contained equal numbers of boys and girls. The M-A *Ss* were from Spanish-speaking homes. Their parents were all migrants who were receiving regular support through public welfare. Most of the M-C *Ss* were taken from a private nursery school and a private kindergarten, both of which were located in Corvallis, Oregon.

Procedures. The basic procedure for observing the *Ss* in Phase II was virtually identical to the method of observation employed for Group II in Phase I. This included the use of the simulated TV set, the scale for observing visual, verbal, and motor behavior, the kaleidoscopic distractor, and, where no permanent one-way viewing facility was present, the portable one-way viewing booth. The *Ss* were introduced to the situation in the same manner as described earlier under the Procedures section of Phase I. Both the kaleidoscopic distractor and the cue light for signalling the observer as to the beginning and end of each observation interval were operated by a single timing device, so that both came on for the last five seconds of each thirty-second interval throughout each program.

Each *S* was shown a 15-minute segment from each of five separate educational television programs described in Appendix C. In addition, two animated cartoons were shown. Both program segments and cartoons were shown in black and white. The five program segments were shown to half of the children in each group in one sequential order, and to the other half in the reverse order. The two cartoons were shown to each child last, during a single viewing session. Each child was observed, individually, during six separate viewing sessions (one for each program segment, and one for the cartoons), on six separate, but not necessarily successive days.

The program segments were acquired by the project in the form of kinescopes. One or more kinescopes were chosen and submitted to the project by each of five production centers from around the U.S. The project staff selected one kinescope from among those submitted by each production center. These are identified, and their content briefly defined in Appendix C. The chief criterion for selection was variety--variety in sex and race of performers (there were a Negro and a white male, and three white females), in film content (including musical instruments, live animals, puppets, trains, stories from books, family scenes, etc.), and in intended function (e.g., one segment was clearly oriented toward preliminary instruction in reading, while the others were slightly more entertainment oriented).

The age, sex, ethnic group, and socio-economic status of each S was recorded. Also, each S was given the Peabody Picture Vocabulary Test. Because M-A Ss came from Spanish-speaking homes, they were also given a Spanish-language version of this test as well as the standard English version. The intent here was not to develop and validate a Spanish-language version of the test, but merely to obtain a rough indication of the discrepancy between the English-language and Spanish-language performance of these M-A Ss.

Scoring. Visual attentiveness was scored in the manner outlined in Phase I, earlier. That is, a score of one was assigned when an S's eyes were on the simulated TV program for an entire five-second observation interval; a score of two when the eyes vacillated between the program and anything else in the viewing situation; and a score of three when the eyes were away from the program during all of a given five-second observation

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interval. Following this scoring procedure, a higher score simultaneously represented greater distractability or lower attentiveness to the program.

Results

Complete data were taken for twenty-five observation periods on each of the five program segments, and also for twenty-five observation periods over the combined duration of the two cartoons. The first analyses to be reported are analyses of variance, comparing the average visual attentiveness of boys and girls over the twenty-five observation periods of each of the five programs. As indicated earlier, these analyses were performed primarily for descriptive purposes, and not for the purpose of testing a priori hypotheses.

Comparisons were made among each of three separate groups, as follows:

1. The combined group of two-year-old and three-year-old Middle-Class Ss,
2. the combined group of four-year-old and five-year-old Middle-Class Ss, and
3. the combined group of four-year-old and five-year-old Mexican-American Ss.

(For convenience, four- and five-year-olds will be referred to as "older" Ss, while two- and three-year-olds will be referred to as "younger.") Since there were, thus, data on three samples of Ss, and on five program segments (excluding cartoons) for each sample, fifteen analyses of variance were run for the purpose of comparing the mean attention of boys with that of girls. Separate additional analyses were run in order to compare the mean attention of the younger with that of the older M-C Ss and the mean attention of the older M-C with that of the older M-A Ss. Since these

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additional analyses were performed on each of the five program segments, they represented, in combination, a total of ten additional analyses of variance. Obviously, the total of twenty-five such analyses were not all statistically independent. For the present descriptive purposes, it was considered more desirable to retain the relatively straightforward interpretability of the two- by twenty-five repeated measures design than to employ a factorially higher-order, less readily interpretable design. This decision was partly dictated by the fact that not all factors in the design were completely crossed. For example, there were no two- or three-year-old M-A *Ss*.

Due to the cumbersome nature of the twenty-five analyses of variance and the table of means associated with each, only a summary treatment of the results will be given in this section. The twenty-five tables of Appendix A contain the more detailed data and analysis tables.

1. There were no statistically significant differences in overall mean level of attention for boys and girls. This was true for each and all of the three groups defined above, and across all five program segments.

2. Significant interactions between sexes and observation periods occurred in only two of the fifteen analyses. These occurred with the M-A *Ss* on program segment A, and with the older M-C *Ss* on segment C. The lack of significant interactions indicated that the fluctuations in attention over the twenty-five observation periods for boys rarely followed a different pattern than those for girls, without regard to the over-all magnitude of attention in either group.

3. Five additional analyses were performed in order to compare mean attention level between the younger and the older M-C *Ss*. Significant

differences occurred with program segments A and B. In both cases, the older Ss were more attentive than the younger. Significant differences in mean attention level between observation periods occurred with all five program segments. There were no significant interactions between ages and observation periods.

4. Five additional analyses were made for the purpose of comparing the mean attention level of older M-C Ss with that of the M-A Ss. On all five segments, the mean level of attention obtained for M-C Ss was higher than that obtained for M-A Ss; however, the difference was statistically significant only with segment E. Program E thus had greater appeal to the M-C Ss of this study than to the M-A Ss, even though this particular program (see Appendix C) was expressly designed to reach the culturally deprived.

There were significant differences in attention level between observation periods on segments B, C, D, and E. However, there were no significant interactions. Accordingly, there was no evidence that some types of program content within these program segments tended to appeal to one group, and other types to the other.

5. A comparison of within program fluctuations of attention between the twenty-five means for the twenty-five observation periods of each program yielded significant differences on program segments A, B, and E for the younger M-C Ss; on segments B, C, and D for the older M-C Ss; and on segments B and C for the M-A Ss. These comparisons are sensitive to the degree of variability in mean attention level.

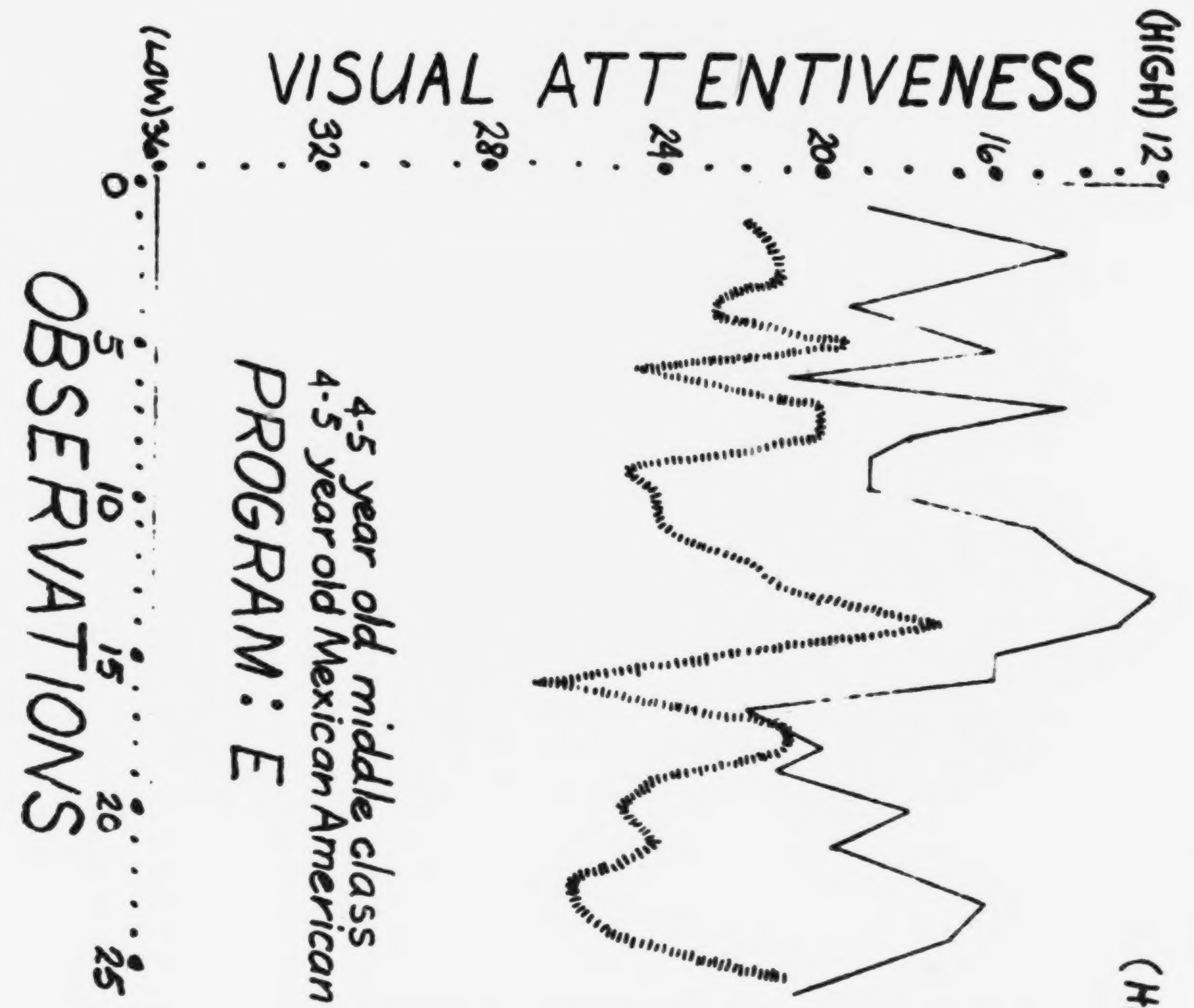
In order further to explore the extent of agreement between patterns of attention from group to group, a further form of analysis was undertaken. This consisted of calculating coefficients of correlation in mean attention between pairs of subject groups over the twenty-five observation periods of each program segment. The three subject groups for which correlations were calculated were older M-C, younger M-C, and M-A Ss. Table 3 displays the correlation coefficients. It was clear from an inspection of the results that the correlations between the younger M-C and the M-A Ss were not greater than those between the older M-C and the M-A Ss. However, in five out of six cases, the obtained correlations between the older and younger M-C Ss were greater than those between the older M-C and the M-A Ss.

TABLE 3. CORRELATIONS BETWEEN PATTERNS OF MEAN ATTENTION FOR THREE VIEWING GROUPS ON EACH OF FIVE PROGRAM SEGMENTS.

Groups	Correlation Coefficients					
	Program A	Program B	Program C	Program D	Program E	Cartoons
Older with younger M-C	.40	.61	.67	.67	.50	.50
Older M-C with M-A	.20	.75	.42	.18	.28	.42
Younger M-C with M-A	.06	.62	.54	.27	.39	.74

Notice that all three of the correlations involving program A are 0.40 or below, while the three involving program B are all 0.61 or higher. If these differences were real, they tended to indicate that the factors giving rise to the fluctuations in attention found with program B were more nearly universal in their effect than those giving rise to the fluctuations found with program A.

For a graphic example of the patterns of mean attention levels upon which the correlations of Table 3 were calculated, see Figure 3. Notice that the over-all level of attention relative to the cartoons tends rather consistently to exceed that relative to program segment E. This same


(HIGH) 12
VISUAL ATTENTIVENESS
16
20
24
28
32
(LOW) 36
0
5
10
15
20
25
OBSERVATIONS
PROGRAM: E
4-5 year old middle class
4-5 year old Mexican American

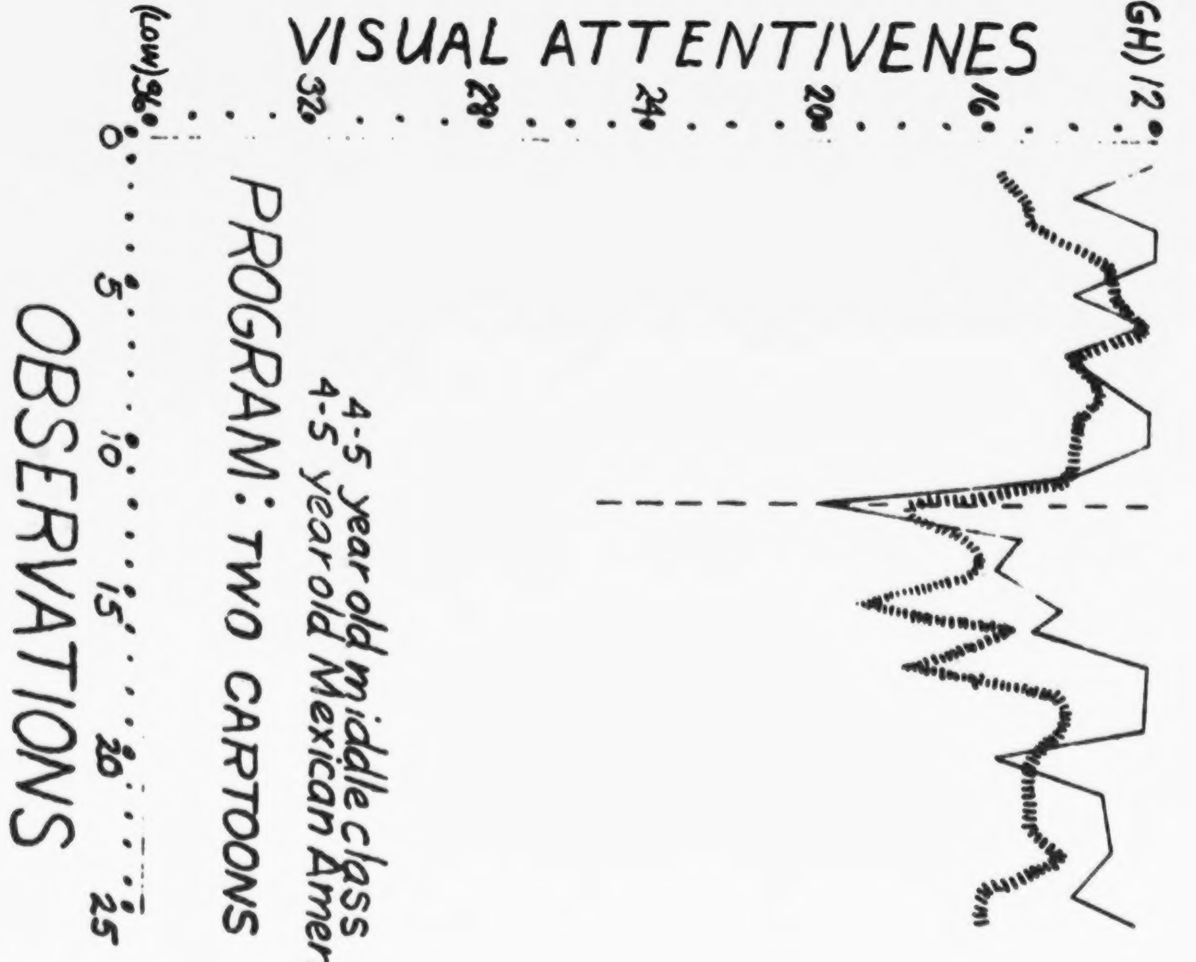

(HIGH) 12
VISUAL ATTENTIVENES
16
20
24
28
32
(LOW) 36
0
5
10
15
20
25
OBSERVATIONS
PROGRAM: TWO CARTOONS
4-5 year old middle class
4-5 year old Mexican American

Figure 3

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relationship holds between the appeal of the cartoons and the appeal of the other four program segments, as well. The drop in attention at observation twelve for the cartoons came at the end of the first cartoon, during the time when the credits were being shown. As an indication of the extent of the appeal of the cartoons, consider that a magnitude of 12 meant that the 12 children in a given group were all looking at the cartoon during the entire five-second observation interval. This magnitude of S attention never occurred with any of the other five program segments. A magnitude of 36 would indicate that all 12 of the Ss in a group were looking away during the entire duration of a given five-second observation interval. Another way to place the magnitude of attention for cartoon viewing into perspective is to point out that for segments A through E combined, an average of 11.73 of the 36 Ss in the three viewing groups--or approximately one out of every three--were looking away from the program during the entire duration of the typical five-second observation interval.

It should be pointed out that this figure does not necessarily generalize to the typical television-viewing situation in the home, especially in light of the fact that in the present experimental situation, the kaleidoscopic distractor contributed to non-attention. There is presently no information to indicate how closely the effects of this distractor approximate the effects of the various distractions present in the typical home.

Table 4 shows the means and standard deviations for the three groups of Ss on the Peabody Picture Vocabulary Tests. Notice that the scores for the Mexican-American Ss, who were four and five years of age, were not only far below those of the older Middle-Class Ss, but also below those of two- to three-year-old Middle Class Ss. Notice also that the mean score obtained by the Mexican-American Ss on the Spanish-language version of the Peabody, is nearly identical with the mean achieved by the same Ss on the English-language version.

TABLE 4. MEANS AND STANDARD DEVIATIONS FOR SPANISH AND ENGLISH PEABODY RAW SCORES AND CHRONOLOGICAL AGE.[a]

Variables	Subjects					
	Younger M-C Children (N=12)		Older M-C Children (N=12)		M-A Children (N=12)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Spanish Peabody	--	--	--	--	20.6	13.4
English Peabody	29.5	18.4	55.3	17.6	19.6	13.8
Chronol. Age	36.5	--	59.0	--	58.3	--

[a] Both Spanish and English Peabody Scores are reported in raw-score form. Chronological age is reported in months.

A tendency toward consistent individual differences in attention was evident in the correlations of Tables 5 and 6. To the extent that the correlations in attention from program to program were high and positive, they reflected a tendency for individual Ss to sustain a uniform level of attention from one program to the next. Notice also that with the 12 M-A Ss of this study, there was not a significant correlation between the Spanish-language and the English-language versions of the Peabody. The results for the M-C Ss show that there are slight to moderate positive correlations between Peabody scores and attention level, as well as between chronological age and attention level. Since the Peabody raw scores correlate rather highly with chronological age among the M-C Ss, it was not clear whether there was any correlation between Peabody performance and attention γ

TABLE 5. CORRELATIONS FOR MEXICAN-AMERICAN CHILDREN AMONG SPANISH AND ENGLISH PEABODY RAW SCORES, CHRONOLOGICAL AGE AND LEVEL OF ATTENTION TO EACH OF SIX PROGRAMS [a]

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Spanish Peabody	--	33	24	24	37	62*	23	49	25
2. English Peabody		--	43	25	48	53	42	55*	34
3. Chronol. Age			--	40	44	75	21	45	33
4. Attention, A				--	52	66	58	61	46
5. Attention, B					--	67	70	78	26
6. Attention, C						--	77	85	55
7. Attention, D							--	87	56
8. Attention, E								--	49
9. Attention, Cartoons									--

[a] Signs and decimal points have been omitted her for convernience. All correlations between attention scores and the other three variables are negative, due to the fact that lower scores represent higher attention. All other correlations are positive. For a two-tailed test of significance, given 10 degrees of freedom, correlations greater than ± 0.55 are significantly different from zero.

TABLE 6. CORRELATIONS AMONG PEABODY RAW SCORES, CHRONOLOGICAL AGE AND ATTENTION LEVEL TO EACH OF SIX PROGRAMS, FOR MIDDLE-CLASS CHILDREN OF ALL AGES COMBINED [a]

	1.	2.	3.	4.	5.	6.	7.	8.
1. Peabody (Raw)	--	88*	60*	53*	33	39*	44*	51*
2. Chronol. Age		--	54	49	26	28	48	42
3. Attention, A			--	59	66	62	68	66
4. Attention, B				--	60	63	58	56
5. Attention, C					--	82	64	81
6. Attention, D						--	55	73
7. Attention, E							--	59
8. Attention, F								--

[a] Signs and decimal points have been omitted here for convenience. All correlations between attention scores and the other two variables are negative, due to the fact that higher scores represent lower attention. All other correlations are positive. For a two-tailed test of significance, given 22 degrees of freedom, correlations greater than ± .36 are significantly different from zero.

level other than that which is due to chronological age. Therefore, partial coefficients of coreelations were calculated, showing the degree of relationship between Peabody performance and attention level with chronological age held constant. Table 7 shows the results. None of the correlations was large enough to be considered greater than zero at the .05 level of statistical significance. Accordingly, there was no evidence that Peabody performance had any correlation with attention level when chronological age is partialled out.

TABLE 7. PARTIAL CORRELATIONS BETWEEN PEABODY PERFORMANCE AND ATTENTION LEVEL WITH CHRONOLOGICAL AGE HELD CONSTANT

Program	English-Language Peabody		Spanish Peabody
	M-C Ss (N=24)	M-A Ss (N=12)	M-A Ss (N=12)
A	.30	.09	.19
B	.25	.35	.01
C	.21	.35	.02
D	.31	.37	.10
E	.06	.45	.22
Cartoons	.33	.23	.47

All the Phase II results up to this point have dealt with the data from the visual category of the experimental scale for the observation of viewing behavior. In addition to the visual category, the scale included a motor category, with sub-categories as shown in Figure 2, and a verbal category. In general, the motor and verbal categories failed to yield useful data for determining the most appealing types of program content. This was largely due to the fact that program-related motor and verbal behaviors were exceedingly rare, or even totally absent, over extensive

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portions of the various program segments. Table 8 shows the frequency of program-related motor responses within each of the three main groups of Ss on each of the six programs. Each of these frequencies represents a combination of all the program-related behaviors included in the observation scale, including rhythmic, imitative, teacher-directed, and emotive. The greater frequency of program-related responses relative to programs D and E is consistent with what was very clearly the deliberate intent of the performers in these programs to elicit participation and responsiveness from the viewers.

TABLE 8. FREQUENCY OF PROGRAM-RELATED MOTOR RESPONSES

Group	A	B	C	D	E	Cartoon
2-3 M-C	7	1	5	30	20	3
4-5 M-C	15	10	7	45	48	16
4-5 M-A	4	1	1	14	9	7

The extent to which the various performers tended to elicit such behaviors will be shown in detail later, in connection with the analysis of program content. Notice in Table 8 also that, over-all, the older Middle-Class Ss engaged most in program-related motor behaviors, the younger M-C Ss second most, and the Mexican-American Ss least.

A more detailed report on motor behavior will not be given, since the frequency with which behaviors in the various sub-categories occurred was so low as to yield no useful information. Similarly, the data on verbal behavior yielded no useful information concerning the types of program content which made for higher or lower appeal.

Lastly, results were examined in an attempt to determine possible program contents associated with high attentiveness, and thus to supply directions for future, more definitive research efforts.

The behavior of the teacher-performers who appeared in the various program segments was clearly a component of program content which could be described and related to fluctuations in attention. For the preliminary purposes of this study, the behavior of the performers was analyzed in terms of a very limited number of categories from Schalock's (1967) scale, which was designed for the observation and analysis of teacher strategies used in the classroom. An observer with extensive training in the use of this scale made the ratings. Program segments A and C contained lengthy portions with no clear instructional purpose. As a result of the fact that they did not therefore lend themselves to description in terms of the categories contained in the rating scale, they were excluded from this form of analysis. One category of Schalock's scale describes teacher moves or strategies, such as asking questions which were apparently designed to precipitate performance on the part of the pupils. By rating various program segments in terms of this category, it was possible to evaluate the relationship between such moves and the motoric responsiveness of the viewers. For program segments B, D, and E, there were 8, 61 and 27 such moves, respectively. Compare this with the results of Table 8, which shows that for program segments B, D, and E, respectively, there were a total of 12, 89 and 77 program-related motoric behaviors. Taken jointly, these results suggest that the number of program-related motoric behaviors may be a function of the number of teacher moves which were intended to precipitate performance.

In addition to the total number of teacher moves, the programs were also examined in terms of the number of different types of teacher moves made by the various performers, for example, asking questions, giving structure, and maintaining performance. The expectation was that mean over-all attention levels are positively related to the number of different types of moves employed by the performers. Performer B used 7 types of moves; performer D, 24; and performer E, 21. The mean over-all levels of attention for these programs, are approximately 2, 1.7, and 1.8 respectively, based upon the combined results for all three of the main viewing groups. While no statistical tests of relationship were performed, the results suggested that attention would be lower where the number of teacher moves was lower, and higher where the number of teacher moves was higher. Further research is needed in order to evaluate the reliability of this relationship.

Program content was also examined to investigate the content of program segments associated with relatively high interest levels across all groups. It was noted that approximately half of the visuals in these program segments were focused on single inanimate objects, while the other half were divided between humans, animals, landscapes or various conglomerate scenes. This finding led to several speculations as to the possible appeal of this type of visual:

1. In some of the segments, the teacher was labeling and describing the uses of the object being shown, and this may appeal to the child interested in acquiring competency and control of his environment;
2. The interest evidenced may be related to the element of novelty, as when an object was introduced for the first

time on the program, or when a familiar object was seen from an unfamiliar visual angle.

Resultant analysis of program content centered around an attempt to categorize thirty-second program segments in terms of the introduction or failure to introduce one or more new sounds, objects or activities. In order to achieve a satisfactory level of agreement between the various raters of program content, the rating of new sounds and activities was deleted, so that the ratings came to be made on the sole basis of object novelty. Even with this modification, attempts to define object novelty were never highly satisfactory, either conceptually or in terms of inter-rater agreement, or a result of several ambiguities relative to such a definition. For instance, it was necessary to restrict the question of object novelty to objects which were part of the central focus of the program, so that it became necessary, in turn, to deal with the problem of defining "central focus of the program." Further ambiguities which arose were (1) whether novelty should refer to the first introduction of an object during the entire program, or to its first introduction within each thirty-second interval; (2) whether a number of successively introduced objects within a single category were each to be considered novel; (3) whether a previously shown object which was presented with a new focus, from a new angle, or in a new conceptual context (e.g., as in shifting from consideration of the whole object to consideration of a part, or vice versa) should be considered to be a novel object.

For pilot purposes, a definition of novelty was developed in relation to one of the five main program segments, then this definition was applied to a second main program segment, segment D. Over the course of segment D, a number of simple musical instruments were introduced. This definition of object novelty held an object to be novel only upon its first introduction during the program; it held each successively introduced object within the same narrow category to be novel; and it did not consider an object to be novel when re-introduced from a new angle, with a new focus, or in a new conceptual context.

Following this definition, two independent raters rated each thirty-second interval throughout segment D for the introduction of one or more novel objects. Each of these thirty-second periods terminated simultaneously with the termination of a five-second observation interval. The two independent raters agreed on nineteen out of twenty-five thirty-second periods. The mean attention level for the 12 older M-C Ss and for the 12 younger M-C Ss was calculated over the 7 periods when one or more new objects were introduced, and also over the 12 periods during which no new objects were introduced. The data were omitted for the 6 observation periods upon which the two raters disagreed. For the older M-C Ss, the mean level of attention was 1.29 for the periods when novel objects were introduced, and 1.67 for the periods when no novel objects were introduced. Since the lower mean represents a higher level of attention, attention was higher during the intervals when novel objects were introduced. The difference between these means, as determined by the use of the t test for correlated data, was significant at $p < .01$ level, using the t test for correlated data. The correlations between the scores for the intervals during which new objects were introduced and those for the intervals during which no new objects were introduced were 0.64 for the older M-C Ss and 0.91 for the younger M-C Ss. These two correlations, both significantly greater than zero at the .05 level of confidence, may be taken as independent estimates of the reliability of the measure of visual attentiveness. However, it is possible that they are not typical of the correlations one would expect on the basis of a split-half procedure involving randomization.

The final method for attempting to relate program content to fluctuations in attention consisted of observing each of the five program segments concurrently with three graphs, where each of these graphs depicted the fluctuations in attention for one of the three main viewing groups. The fruits of this method are more properly interpreted as a set of hypotheses. For this reason, they will be presented as such under the Summary and Conclusions section, below.

SUMMARY AND CONCLUSIONS

One major result of this study has been the development of what is probably the most useful method now available for measuring attentiveness to television programs among children as young as two years of age. This method was based upon the use of an observer rating scale with the periodic introduction of a distractor in competition with the ongoing program. One form of data yielded by this method was graphs which showed fluctuations in attention level from point to point over the course of a given program.

The information which resulted from the use of this method had dual implications. First, it may be interpreted as a measure of attention level on the part of individuals or groups. Following this interpretation, it is possible to compare the interest of two mor more individuals or groups relative to a given segment of program material. Secondly, it may be interpreted as a measure of program appeal, making it possible to compare content appeal from segment to segment over a given program, or between entire programs.

The main phase of research in this study was undertaken for two main purposes. These purposes related respectively, to the two possible forms of interpretation mentioned immediately above. The first was to compare the patterns of attention exhibited by children who differed in age, sex, or social characteristics. The subjects were equal numbers of boys and girls in each of three main viewing groups. The first main viewing group consisted of two- and three-year-old middle-class children; the second, of four- and five-year-old middle-class children; and the third, of four- and five-year-old Mexican-American migrant children from low-income homes. The second purpose was to evaluate the appeal of various types of content contained in each of five preschool children's television programs, and in a set of animated cartoons. All of these programs were presented in black-and-white, to individual children, by means of a simulated television set. Observers recorded visual, verbal, and motor behaviors, following a scale designed especially for this purpose.

Comparisons between mean attention levels for various sex, age, and socio-economic groups were performed. Each of these comparisons involved the use of a repeated-measures analysis of variance design, which consisted of crossing the comparison groups with the twenty-five observation periods for each of the five programs. Separate boy-girl comparisons were made for each of the three main viewing groups, and for each of the five programs, yielding fifteen such comparisons in all. None of the differences was statistically significant. The mean levels of attention for the older and younger middle-class children differed significantly on two of the five programs. In both cases, the older children were more attentive. Significant differences between the four- to five-year-old middle-class children and the Mexican-American migrant children of the same age occurred with only one of the five programs.

The analysis of variance design employed here also yielded information on interactions between comparison groups and observation periods. For example, interactions between sexes and observation periods would indicate that the fluctuations in attention on the part of the boys over the twenty-five observation periods followed a different pattern than those for girls, independently of the over-all level of attention exhibited in either group. Significant interactions were found in only two of the fifteen comparisons involving sexes; in none of the five involving ages; and in none of the five involving Mexican-American migrant vs. middle-class children. In summary, the results reveal a very high degree of generality in terms of the types of program content which appealed to the age, sex, and social groups studied here.

These results, however, should be interpreted in the view of the finding that the mean attention level for all groups viewing these ETV programs could, theoretically, be vastly improved. Overall, 1/3 of all the children observed were not watching the program during the observation periods, while the cartoons, by contract, were far more effective in capturing and sustaining the attention of these preschoolers.

Among the various analyses of program content which were performed, some led to fairly clear conclusions and others to very tentative hypotheses, requiring further evaluation. The animated cartoons were clearly more effective than any of the five instructional preschool television programs in capturing and sustaining the attention of the children in this study, who were between two and five years of age. The evidence also suggested that attention tended to be higher at the end of those thirty-second intervals during which new objects were introduced, than at the end of similar intervals during which no new objects were introduced. Further research is recommended for the purpose of exploring additional ways in which novelty may be involved in determining program appeal. As an incidental point, it may be useful for certain purposes to define the pace of a program in terms of novelty, or the rate of introduction of new objects, activities, or sounds. The evidence cited above suggested that if pace were defined in terms of novelty, a greater pace will tend to result in a higher level of attention.

Another aspect of program content was the behavior of the teacher-performer. The five instructional preschool programs studied here all employed a single major performer acting as a teacher, often in a simulated classroom. Accordingly, an attempt was made to define program content in terms of the teaching strategies employed by these performers. Although this was a very limited, preliminary exploration, at least one result seems worthy of further research. This was the result suggesting that the greater the number of different types of teaching strategies, or moves, employed by the performer, the greater the performer's appeal to the children. The number of different types of teaching strategies employed by a performer may be interpreted as one more form of novelty in program content.

The results of this study, undertaken in relation to televised instruction, clearly have implications for direct face-to-face classroom instruction as well, it seems likely that many of the same factors which make for appeal in televised presentations will also make for appealing classroom presentations.

Among the subsidiary results of the study, one was that for all five of the locally produced instructional programs, and for the children from all three subject groups combined, nearly one out of three children were looking away from the simulated television set during the entire duration of the typical five-second observation period. By contrast, only very rarely did a child ever look away from the animated cartoons. These outcomes must be interpreted in view of the fact that the colorful, moving, kaleidoscopic image which served as a visual distractor was introduced during the entire duration of each five-second observation interval, and that this level of distraction may not be equivalent to that found in the typical home during a similar interval.

Another incidental result was the fact that the Mexican-American children did no better on a Spanish - Language version of the Peabody Picture Vocabulary Test than on the standard English-language version, and that their scores of this test were not only far below those of the Middle-Class children of the same age, but also below those of the two- to three-year-old Middle-Class children. For all of the Middle-Class children combined, there were rather consistent positive correlations between raw Peabody Picture Vocabulary Test scores and attention level relative to each of the five main programs. However, when chronological age was partialled out, none of the residual correlations was significant. This result suggested that insofar as the programs studied here were concerned, attention to their content was not closely related to the language skills measured by the Peabody, although it does tend to be related to a combination of these skills and factors associated with chronological age.

Observations based upon certain verbal and motor aspects of behavior showed no relationship to television-viewing attentiveness. This result may have followed at least in part from the fact that it was not always possible to distinguish clearly between motor behaviors which resulted from boredom and those which resulted from interest and enthusiasm. On the other hand, preliminary results indicated that there may be a substantial relationship between the number of attempts a teacher-performer makes to precipitate motoric behaviors and the number of program elicited motoric behaviors actually exhibited by the children. The observation records revealed marked individual differences in the tendency to imitate the performer freely, i.e., without having been instructed to do so, and also in the tendency to perform simple motor acts upon the performer's bidding. The Mexican-American children were far less overtly responsive than their middle-class age cohorts.

In observing the children of this study individually over extensive periods of program viewing, the investigators gained a number of subjective impressions about the aspects of program content which made for higher or lower appeal. Although these impressions were not all directly substantiated by the systematically recorded results of the study, they will be offered here as hypotheses for further research, or as very tentative recommendations upon which to base production decisions. Attention seemed to be heightened by any form of novelty, including the introduction of novel objects, sounds, or activities. Moreover, the children seemed particularly resistent to distraction whenever a performer alluded verbally to the imminent prospect of turning to new objects of activities. The middle-class children appeared to be more attentive following the teacher-performer's questions than the Mexican-American children. Indeed, questions seemed to make the Mexican-American children more distractable, possibly more anxious, than usual. If this apparent effect is real, it has clear, general implications for the instruction of such children.

Among the additional factors which appeared to result in particularly high or particularly low attentiveness, only a small number stood out with any reasonable clarity. The observers were unanimous in their opinion that the teacher-performers tended to rely heavily upon a strategy of introducing only a very small number of different objects or activities, and then of making extended comments or "lectures" about the attributes, functions, or purposes of them. An extended didactic discourse around a single object or event tended to diminish attentiveness markedly, while, as the results cited earlier bear out, the introduction of one or another form of novelty tended to increase it. As for highly appealing content, in one scene, the performer reads a story while the camera alternated between close-up shots of her face and the individual pages of the book. Attention level rose sharply, but quite gradually, during the course of the story. One of the factors which may have contributed to the appeal of the story was the prominent appearance of the incongruously large dog (larger than a house), simple line drawings, the slow clear speech of the teacher, and the very simple vocabulary used.

One general conclusion of the investigators was that the appeal of locally produced instructional programs for young children can and should be increased. The evidence relative to the cartoons shows clearly that children between two and five years of age are capable of intensively sustained television-viewing attention over periods of at least eight to ten minutes, and possibly longer. It is a moot question, in terms of the results of this study, whether more appealing program content would result in more effective instruction, all else being equal. However, it seems reasonable to suggest, in view of the nature of the broadcast medium, and particularly in view of the fact that the learners do not ordinarily comprise a captive audience, that greater appeal will produce a larger audience, and possibly more efficient if not more effective instruction.

Finally, there is a clear need for additional research concerning the types of program content which capture and sustain the attention of young children. There is a particularly clear need for methods of measuring various aspects of program content so that these may be related in turn not only to attention but also to learning.

BIBLIOGRAPHY

Adkins, E.P. "Instructional Television at Indiana State College." Teach. Col. J. 34:162. My'63

Aikens, H.H. "Educational Television & the Curriculum." Ohio Sch. 40:36-7 Mr'62

Alexander, F.G. "Teaching Fundamental Concepts of Mathematics at the College Level by closed-circuit Television." Math Teach. 56:627-31. D'63

Allen, L.H. "Launching a successful AV Program." Ed Screen Av. G. 41: 656-7 N'62

Apfel, A. "Close-Circuit TV in the School Library." ALA Ball. 57:259-60 Mr'63

Bardsley, F.G. & Eck, T.W. "Closed-Circuit Instructional TV." J. Health Phys. Ed. Rec 36:32 My'65

Barson, J. & others "Standard Operating Procedures for a Learning Resource Center: a system for producing systems." AV. Instr. 10:378-9, My'65

Battin, R. Ray "Two methods of Presenting information on Speech and Language Development." J. speech hear Dis., 1962, 27, 17-22

Becker, S.L. and Wolfe, G.J. "Can Adults Predict Children's Interest in a Television Program?" in Schramm, W. (Ed.), The Impact of Educational Television; selected studies from research sponsored by NETRC. Urbana, University of Illinois Press, 1960. 195-213.

Becker, Samuel L. & Dallinger, Carl A. "The Effect of Instructional Methods upon Achievement and Attitudes in Communication skills." Speech Manager, 1960,27, 70-76

Berlyne, D. E. Structure and Direction in Thinking. New York: John Wiley & Sons, 1965.

Blair, C.V. "Closed-Circuit Television: one Answer." Am. Sch. Bd. J. 148:53-4, F'64

Brian, Sister Mary "TV demands a Teaching Team." Cath. Sch. J. 65:38 My'65

Bridges, C. C. "An Attention Scale for Evaluating ETV Programs." Journal of Educational Research, 1960, 54, 149-152.

Brumbaugh, R.B. "Some unanswered Questions about ETV." Pa. Sch J. 112:113 +. N'63

Brumberg, D. "Closed-Circuit Television: a Success in Science Instruction." Calif Ed 2:7-8 My'65

Burns, John W. and Smith, "AV Elements in Science Telelessons", Audio Visual Communications Review, 1966, 14, 467-478.

Bystrom, J. "Federal Aid to Educational Television; Educational Television Facilities Act of 1962." Av. Instr. 8:412-14, Je'63

Cameron, Charles C. "Five Schools Linked Together for TV Teaching." J. med. Ed., 1959,34, 1077-1081

Carle, A. "Instructional Television and The Classroom Teacher." Teach. Col. J. 34:186-8 My'63

Corner, R.L. "Effect of Televised Reading Instructions on Attitudes Toward Reading." El. Eng. 39:234-6 Mr'63

Christianson, D.E. "Experimenting with Geography Teaching by Television." il diag. J. Geog. 65:59-64 F'65

Cobin, Martin T. & Clevenger, Theodore Jr. "Television instruction, course content & Teaching Experience Level: an Experimental Study in the Basic course in Oral Interpretation?" Speech Monog., 1961,28, 16-20.

Cobun, T.C. "How to Train Students to use AV Equipment." Nations Sch. 75:84 Mr'65

Cobun, T.C. "Are your Teachers good in the Classroom but Duds on TV." Nations Sch. 75:82, Ja'64

Creshkoff, Lawrence "Closed-Circuit Television in School & Community: the Chelsa project." J. Soc. Motion Pict. TV Engineers. 1959, 68, 764-768

Curtis, H.A., & Kropp, R.P. "Standard & Visual Administration of the Concept Mastery Test." Audio Vis. Common Rev. 1962, 10(1), 38-42

Daniel, Sister Mary "Closed-Circuit TV Teaching: the Teachers Viewpoint." Nat. Cath. Ed. Assn. Bali 60:312-16 Ag'63

Deese, J. "Comment & Summary: a Mine of Possible Applications." AV Comm. R. 9:79-87 S;61

Diamond, R.M. "Instructional Material within the Seminar." Ed. Screen Av. G 44:32-4 F'65

Doi, E. "AV Materials on the Move." Voc. Guid. Q 13:213 Spr'65

Donald,R. "Instructional Materials for Closed-Circuit Television." Instr. 74:65 Je'65

Dupre, H. "Comparative Study of an Introductory geography course on ETV and in the classroom." Sei. Ed. 46:27 F'63

Dworkin,Solomon, & Holden, Alen   Bell Telephone Lab, Murray Hill, N.J. "An Experimental evaluation of Sound Film Strip vs. Classroom Lectures."

Erickson, C.G. "Chicago's TV College; TV makes Every Chicago home a potential two year College." Jun. Col. J. 33:22-4+ My'63

Evans, Richard I., Wieland, Betta A., & Moore, Charles W. "The Effect of Experience in Telecourses on Attitudes toward Instruction by Television and Import of a Centraversial Program." J. appl. Psychol., 1961,45,11-15.

Evans, Richard I. "A Psychological investigation of a group of Demographic, Personality and Behavioral Variables as they relate to viewing Educational Television." J. appl. Psychol., 1961,45,25-26

Fairbank, R.E. "Television Instruction in Business Mathematics." Nat. Comm. Teach. Ed. Proj. Stand Official Report 1963: 246-52

Faris, G. "Sources of Information on Aubio-Visual Materials for use by Social Studies Teachers?" Social Studies 54:177-81 O'63

Fario, G. "Tentative Guidelines for AV Personel & Equipment." AV Instr. 10: 201-4 Mr'65

Fidler, William P. "Educational Television: a Faculty Point of View." Auart, J. Speech, 1959,45,121-127

Follis, L. "TV Taping: a Rewarding & Remarkable Departure." ED Screen AV. G. 44: 17 + My; 19+ Je'65

Francis, Brother A. "Educational TV: a Principals Point of View." Nat. Cath. Ed. Assn. Bal 60:308-312 Ag'63

Gauerke, H.J. & Cardew, A.K. "Teacher Training via TV." Mod. Lang. J. 47:69-70 F'63

Glassman, F.A. "Lets take another look at ETV." Clearing House. 38:20-2 S'63

Goetginger, C. & Valentine, M. "Faculty Attitudes Toward Educational TV: a Survey Report & Preliminary Analysis." Speech Teach 12: 127-30 Mr'63

Goldberg, A.L. "ETV: Emphasis on the Learner." Mich Ed. J. 39:527 Ap'63

Goodman, J.L.; Evans, H.C. J; Senft A. "Audio Visual College Counseling" Ed. Screen. AV. G 41:204-6 Ap'62

Gordon, Morton J. "Third Grade Television-Classroom Articulation Program." J. Speech Hear. Dis., 1960, 25: 398-404

Gottschalk G.H. "Closed-Circuit Television in Second Semester College Gorman. Bibliog. Mod. Lang. J. 49:86-91. F'65

Gould, S.B. "Educational Television in the next Decade." Ed. Rec. 44:377-88, O'63

Gratz, J.E. "How to Plan Typing Lessons for TV." Bsn. Ed. World 45: 12:14 Ja'65

Grills, J.E. "Classroom Teacher & Instructional TV." Teach. Col. J. 34:179-84 My'63

Guba, E. and Wolf W. Perception and Television: Physiological Factor of Television Viewing. Columbus: The Ohio State University Research Foundation, 1964. 128 pp. (NDEA Title VII Project #875).

Guba, E. et al. "Eye Movements and TV Viewing in Children", AV Communications Review, 1964, 12, 386-401.

Haines, F.D. "TV on a Shoestring." Improving Col. Univ. TEach. 11:82-3 Spra'63

Harcleroad, F. "Theoretical Formulations in AV Communications." R. Ed. Res. 32:119-26 Ap'63

Hortman, Frank R. "Recognition Learning under Multiple Channel presentation on Testing Conditions." Audiovis. Common. Rev, 1961,9(1),24-43.

Hayman, John L., Jr. "View Dr. Location & Learning in Instructional TV." Audiovis. Commun. Rev. 1963, 11(3),27-31

Hayman, John L.,Jr. & Johnson, James T., Jr. 'Exact vs Varied Repetition in Educational Television." Audiovis, Commun. Reo, 1963, 11(4),96-103

Hok, R. "Testing Teacher Trainees by means of Closed-Circuit TV. and MLA film No'5 Lang. Learn 14 No 1/2:55-9 64

Insel, Shepard A., Schlesinger, Kurt & Derosiers, Wilfred. "Dependency Responses to Telvised Instruction." J. Appl. Psychol., 1963, 47(5), 328-331

Janes, R.W. "Televised Lecture as a Conservative Inovation in the Instructional Environment." Ed Theor 13:285-93+ O'63

Jantzen, V.W. "TEaching by Television." Clearing House 39:274 Ja'65

Johnson, E.I. "Removing Roadblocks to the Effective use of Television in Adult Education; report from the 1963 Conference." Adult Lead. 12:203-6 Ja'64

Keasling, H.H., Gross, E.G., Long. J.P. Pittinger, C.B., Fouts, J.R., & Shiptou, H.W. "Report on the use of Closed Circuit Television in the Teaching of Pharmachology." J.Med. Educ., 1959,34,894-897

Kennedy, R. "Ed. TV. in Canada & Abroad" Can. Ed. Res. Digest 5:122-32 Je'65

Ketchum, E.E. "AV Aids on The Campus Scene" Ed. Screen AV G. 44: 24-5, Mr'65

Klapper, Hope Lunin "Prevalent Interests & Concerns in the Field of Televised Instruction." J. Educ. Socio., 1959,32,437-451

Klasek, C. "TV adds Efficiency to Teaching." Sch. Mgt. 9:122-4, Mr'65

Kretsinger, E.A. An experimental study of restiveness in preschool ETV audiences. SpeechMonographs, 1959, 26,72-77.

Landsman, T. & Lane, D. "AV Media, Yes- Depersonalization Nd." AV Instr. 8:24-8 Ja'63

Laviana, D.W. "Modern Magie Lantern: The audio-multiplex system of TV education." Diag. AV. Instr. 9:218-20 Ap'64

Lepore, A.R., Wilson, J.D., Insel, S.A., & Powel, M. "An experimental Study of College Instruction using Broad Cost Television." (Project no. 2, Institutional Television Research) San Francisco, Calif: San Francisco State College,, 1958.77-p.

Levy D. "Don't make the mistakes we did." Ed Screen AV G. 41:201-2+ Ap'62

Lewenhak, H.K. "As far as the Eye can see; Television: a Regional medium." Times Ed. Sup. 2572:510-11 O 2'64

Lewis, P. "Closed-Circuit TV as a Total Service." Instr. 74:69-70 Je'65

Liston, J. M. "Project Discovery: an Adventure in Teaching & Learning with Film. Grade Teach. 82:98-100 My'65

Lonsdale, B.J. "Television & Team Teaching in California Elementary Schools." Calif. J. El. Ed. 31:75-94 N'62

MacLean, Malcolm S., Jr., & Crone, Edgar. "Program preferences: Their implication for the Educational Broadcaster." Audiovis. Commun Rev. 1961,9(2) 85-98

Maeda, Y "What Television can Do: Japan's Experiment." Times Ed. Sup. 2474:483 O19'62

Malloy J. "Sophomores on TV" Cath. Sch. J. 65:37 My'65

Matthews, M "Growing Interest & Experiment" Times Ed. Sup. 2492:349 F22'63

McGrane, J.F. & Baron, Morton L. "A Comparison of Learning Resulting from Motion Picture Projector and from closed Circuit TV Presentations. J. Soc. Motion Pict. TV Engineers, 1959, 68, 824-827.

McIntyre, C.J. & Paden D.W. "Economic Considerations in Televised Instructions." J. Higher. Ed. 33:319-23 Je'62

Mckeachie, W.J. "The Improvement of Instruction." Rev. Educ. Res., 1960,30, 351-360.

Meierhenry, W.C. "Learning theory & av utilization; a Collection of Authoritive papers." AV Comm R 9:3-87 2'61 Review Bills, R.E. AV Instr. 7:;7-18 Ja'62

Miller, E.E. "Some ways AV helps Teachers Teach." Grade Teach 82: 112-23 My'65

Miller, T.E. "Impact on the University; an educational Media Service." AV Instr. 10: 111-114 F'65

Minter, Philip. S., Albert, Fritz A. & Powers, Richard D. "Does Presentation method Effect Film Learning." Audiovis. Comm Rev, 1961,9(4) 195-200

Moskowltz, G. "TX versus Classroom Instruction in Foreigh Language: a Study of Elementary School Childrens Attitudes." J. Exp. Ed. 33: 175-81 Wint'64

Mosteller, F. "Continential Classroom's TV Course in Probability & Statistics" Math Teach 56: 407-13 O'63

Najem R. "Wausan Story in Education Tv.; Marathon County University Center." Mod. Lang. J. 99: 313-15 My'65

Nason, H.M. "Multimedia in Reading Instruction Read Teach 18: 654-9 My'65

Neidt, Charles O., & French, Joseph L. "Reaction of High School Students to Television Teachers." J. Genet. Psychol., 1962, 100(2),337-348

Norberg, K. "Perception Theory & AO Education; Authoritative Papers." AV Comm. R. 10:3-108 S'62

Ohles, John F. "An Approach to Machine Teaching." Sch. Soc. 1960,88,440-441

Oliphant, J. "Instructional Television & Programed Learning: Same Problems of Application and Policy." J. Higher Ed. 35: 488-92 D'64

Peasinger, G. "Shoehorn for Instructional TV" AV Instr. 9:214-17, Ap'64

Pribram, Karl H. Neurological notes on the art of educating. In ERnest R. Hilgard (Ed.) Theories of Learning and Instruction. The Sixty-Third Yearbook of the National Society for the STudy of Education. Part I, Chicago: University of Chicago Press, 1964.

Remley, F.M.,Jr, "TV Playback on Tape & Film." Overview 2:48-9, D'61

Rosenthal, A. "Lecturing by Television; California Experiment." Times Ed. Sup. 2536:939 D27'63

Rottman, Leon H., & Kepers, George L. "The Effectivenss of Television Instruction in Science." New Mexico Society for the Study of Education Edc. Res. Ball., 1963, 1-6

Royds A. "Intelligibility of School Television Programs." Brit. J. educ. Psychol., 1962,32(2), 156-165

Ruhe, D.S. "Medical Demonstration will offer rare opportunities." AV Instr. 7:79 F'62

Sallee, J. "TV is a TEachers Tool." Sch Mgt. 9:126-2 Mr'65

Schalock, H. Del. An Overview of the Teaching Research System for the Description of Teaching Behavior in Context. Monmouth, Oregon: Teaching Research Division, December, 1967.

Schuster, John R. "The Effects of Repetitive Use of Educational Picture Films on Learning." Educational Research Bulletin 1965, Jan 2-6

Scuorzo, H.E. "Audiovisual Testing" Grade Teach 80:15+ S;62

Scuorzo, H.E. "Cross Media: the Use of Two or More Aids in a Single Lesson Grade Teach. 82:124-6, My'65

Seibert, W.F. "Purdue Probes Faculty Needs and Interests in Audiovisual Survey." AV Instr. 8:246-50 Ap'63

Siegel, Lawrence; Adams, James F. & Macomber, F.G. "Retention of subject matter as a Function of Large Group Instructional Procedures." J.Educ. Psychol., 1960,51, 9-13

Smith, J.G. "Teaching Teachers on Television." Times, Ed. Sup. 2454:1134 Jel '62

Solovieva, E.E. "An Experimental Comp of Machine Techniques in a pedagogic investigation." Sovetsk. Pedag., 1962, 26(8) 116-129.

Stasheff "Television, an Effective Arm of the Teacher." Nat. Cath . Ed. Assn. Bal. 60:316-17, Ag'63

Stooks, Ora. "Development of Audiovisual Learning Aids." Education, 1964, 84(6), 368-372

Streit, Wk. "Pointers on Effective TV Instruction." Ohio Sch. 40:34-5 My'62

Syrocki, B.J. & Wallin, R.S. "Two year Study of Teaching Biology via TV." Sci Ed. 46:379-84 O'62

Tanner, Daniel. "Television & Learning." Teachers College Record, 1963 65 (3), 243-249

Tanner, Daniel & Woerhehoff, F.J. "Profiles of Instructional Mythodology for Selected Television Courses." School Review, 1964, 72(2) 201-208

Thiel, J. "TEchnical Media in the Academy of Music & the Creative Arts." Mus Educators J. 47:59-62+ Je'61

Venable, T.C."Teaching by Closed-Circuit Television Teach. Col. J. 36: 162-3, Ja'65

Weiss, D "Closed-Circuit Television & Teacher Education." Ed. Forum 26:229-31 Ja'62

Westley, Bruce H. & Jacobson, Harvey K. "Instructional Television & Student Attitudes Toward Teacher, Course, and Medium. Audiovis. Comm. Rev. 1963, 11(3), 47-60.

White D. "More for AV Education?" Ed Screen AV G 44:34-5 Ap'65

Witham, A.P. "Audiovisual Aids in Developing Word Analysis Skills." El. Engl. 39:375-8 Ap'62

Witt, Paul W.F. "New Ferment in AV." Teachers Call, Rec., 1963, 64(4), 340-343

Witt, P.W. F "Television in Education: Conference Report, Teacher College Columbia University." Sch & Soc 90:408 N 17'62

Wolf, W., et al. "How Do Children Look at Television?" Phi Delta Kappan, 1965, 46, 537-540.

Woodward, J.C. "Feedback & Learning: a cautious Experiment." Ed. Screen AV. G. 44: 18-19+ My'65

Youge, K.A. "Use of Closed-Circuit Television for Teaching Psychotherapeutic Interviewing to Medical Students." Canadian Med. Ass. J. 1965, 92 (7), 747

Young, D.A. "Preparing Teachers to use Television." J. Teach Ed. 13: 181-6 Je'62

APPENDIX A

Tables of Means and Analyses of Variance for Age, Sex, and SES Groups on Program Segments A-E

Table A-I : Means and Analysis of Variance for SES[a] x Observation Intervals on Program A

Mean Score for Visual Attention

Observation Interval

SES	1	2	3	4	5	6	7
M	1.6	1.3	1.7	1.3	1.7	1.7	1.7
L	1.8	1.6	2.2	2.4	2.1	2.0	2.0

	8	9	10	11	12	13	14
M	1.6	1.5	1.7	1.8	1.8	1.9	1.7
L	1.7	1.7	1.9	1.4	2.0	2.0	1.8

	15	16	17	18	19	20	21
M	1.6	1.7	1.4	1.3	1.4	1.7	1.3
L	1.5	1.9	1.9	1.9	1.8	1.7	1.5

	22	23	24	25	Over-all Means (1-25)
M	1.3	1.6	1.7	1.4	1.6
L	1.3	1.7	1.2	1.6	1.8

[a] 4-5 year old lower class (L) Mexican-American children vs. 4-5 year old middle class (M) children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
SES	6.6	1	1.29	4.30
Error	5.1	22		
Within Subjects		576		
Observation	.8	24	1.35	1.52
Interaction	.5	24	.95	1.52
Error	.6	528		

Table A- II : Means and Analysis of Variance for SES[a] x Observation Intervals on Program B.

Mean Score for Visual Attention

Observation Interval

SES	1	2	3	4	5	6	7
M	1.5	1.6	2.2	1.8	1.4	1.2	1.8
L	2.1	2.1	1.9	2.4	1.8	1.6	2.0

	8	9	10	11	12	13	14
M	2.0	2.2	2.0	1.8	1.8	1.3	1.8
L	2.3	2.2	2.3	2.1	1.7	1.9	2.2

	15	16	17	18	19	20	21
M	1.8	1.5	1.5	2.3	2.2	1.9	2.0
L	2.3	1.8	2.2	2.5	2.7	2.1	2.2

	22	23	24	25	Over-all Means (1-25)
M	1.8	1.6	1.3	1.2	1.7
L	1.9	1.8	1.7	1.5	2.0

[a] 4-5 year old lower class (L) Mexican-American children vs. 4-5 year old middle class (M) children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
SES	14.4	1	2.38	4.30
Error	6.1	22		
Within Subjects		576		
Observation	2.0	24	3.52	1.52
Interaction	.3	24	.51	1.52
Error	.6	528		

Table A- IIB Means and Analysis of Variance for SES[a] x Observation Intervals on Program C

Mean Score for Visual Attention

Observation Interval

SES	1	2	3	4	5	6	7
M	1.3	1.6	1.8	1.7	2.3	2.0	1.4
L	1.4	2.1	1.7	1.9	2.7	2.3	2.2

	8	9	10	11	12	13	14
M	1.9	1.3	2.1	1.5	1.2	1.7	1.9
L	2.3	2.0	1.9	1.6	1.9	1.8	1.8

	15	16	17	18	19	20	21
M	1.8	2.3	1.3	1.6	1.3	1.4	1.8
L	1.8	1.8	1.7	1.7	1.8	2.0	2.0

	22	23	24	25	Over-all Means (1-25)
M	2.0	2.3	1.8	1.6	1.3
L	2.3	1.9	1.7	1.8	1.8

[a] 4-5 year old lower class (L) Mexican-American children vs. 4-5 year old middle class (M) children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
SES	6.6	1	1.19	4.30
Error	122.1	2		
Within Subjects		576		
Observation	1.6	24	2.91	1.52
Interaction	.7	24	1.20	1.52
Error	.6	528		

Table A- IV: Means and Analysis of Variance for SES[a] x Observation Intervals on Program D

Mean Score for Visual Attention

Observation Interval

SES	1	2	3	4	5	6	7
M	2.0	1.8	1.8	1.4	1.3	1.1	1.4
L	2.3	1.7	1.8	1.7	1.9	1.8	2.0

	8	9	10	11	12	13	14
M	1.9	1.6	2.0	1.5	1.8	1.3	1.7
L	1.6	2.0	2.1	2.3	2.0	1.8	1.7

	15	16	17	18	19	20	21
M	1.3	1.3	1.5	1.2	1.1	1.3	1.2
L	1.9	2.0	1.6	1.5	1.7	1.5	1.9

	22	23	24	25	Over-all Means (1-25)
M	1.6	1.6	2.1	1.4	1.5
L	1.9	2.1	1.8	2.6	1.9

[a] 4-5 year old lower class (L) Mexican-American children vs.4-5 year old middle class (M) children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
SES	20.2	1	3.86	4.30
Error	5.2	22		
Within Subjects		576		
Observation	1.1	24	2.09	1.52
Interaction	.8	24	1.47	1.52
Error	.5	528		

Table A- V : Means and Analysis of Variance for SES[a] x Observation Intervals on Program E

Mean Score for Visual Attention

Observation Interval

SES	1	2	3	4	5	6	7
M	1.6	1.2	1.3	1.7	1.3	1.8	1.2
L	1.8	1.8	1.8	1.9	1.6	2.1	1.7

	8	9	10	11	12	13	14
M	1.5	1.6	1.6	1.3	1.2	1.0	1.1
L	1.8	2.1	2.0	2.0	1.8	1.8	1.4

	15	16	17	18	19	20	21
M	1.3	1.3	1.8	1.7	1.8	1.5	1.7
L	1.8	2.3	1.8	1.8	2.1	2.2	2.1

	22	23	24	25	Over-all Means (1-25)
M	1.4	1.3	1.4	1.8	1.5
L	2.3	2.1	2.1	1.9	1.9

[a] 4-5 year old lower class (L) Mexican-American children vs.4-5 year old middle class (M) children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
SES	31.3	1	5.73	4.30
Error	5.5	22		
Within Subjects		576		
Observation	.9	24	1.74	1.52
Interaction	.3	24	.68	1.52
Error	.5	528		

Table A- VI : Means and Analysis of Variance for Age[b] x Observation Interval on Program A

Mean Score for Visual Attention

Observation Interval

Age	1	2	3	4	5	6	7
4-5	1.6	1.3	1.7	1.3	1.8	1.8	1.8
2-3	1.8	1.8	2.0	2.1	2.0	2.1	2.8

	8	9	10	11	12	13	14
4-5	1.6	1.5	1.8	1.8	1.8	1.9	1.7
2-3	2.3	2.2	2.2	2.3	2.4	2.1	2.1

	15	16	17	18	19	20	21
4-5	1.6	1.7	1.4	1.3	1.4	1.8	1.3
2-3	2.5	2.6	1.8	2.0	2.0	1.9	2.1

	22	23	24	25	Over-all Means (1-25)
4-5	1.3	1.6	1.7	1.4	1.6
2-3	2.0	1.6	2.2	1.9	2.1

[b] 4-5 year old middle class children vs.
2-3 year old middle class children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
Age	39.0	1	6.28	4.30
Error	6.2	22		
Within Subjects		576		
Observation	.9	24	1.65	1.52
Interaction	.4	24	.75	1.52
Error	.5	528		

Table A-VII : Means and Analysis of Variance for Age[b] x Observation Interval on Program B

Mean Score for Visual Attention

Observation Interval

Age	1	2	3	4	5	6	7
4-5	1.5	1.6	2.2	1.9	1.4	1.2	1.8
2-3	2.3	1.9	2.3	2.3	1.8	1.9	2.0

	8	9	10	11	12	13	14
4-5	2.0	2.2	2.0	1.8	1.8	1.3	1.8
2-3	2.1	2.3	2.4	2.3	2.3	2.1	2.3

	15	16	17	18	19	20	21
4-5	1.8	1.5	1.5	2.3	2.2	1.9	2.0
2-3	2.7	2.2	2.1	2.0	2.6	2.3	2.6

	22	23	24	25	Over-all Means (1-25)
4-5	1.8	1.6	1.3	1.1	1.7
2-3	2.3	2.2	1.7	1.5	2.2

[b] 4-5 year old middle class children vs.
2-3 year old middle class children

Analysis of Variance

Source	MS	df	F	F.95
Between Subjects		23		
Age	29.9	1	4.77	4.30
Error	6.3	22		
Within Subjects		576		
Observation	1.8	24	3.34	1.52
Interaction	.4	24	.83	1.52
Error	.5	528		

Table A-VIII: Means and Analysis of Variance for Age[b] x Observation Interval on Program C

Mean Score for Visual Attention

Observation Interval

Age	1	2	3	4	5	6	7
4-5	1.3	1.6	1.8	1.7	2.3	2.0	1.4
2-3	1.4	2.3	1.5	1.9	2.3	2.0	1.8

	8	9	10	11	12	13	14
4-5	1.9	1.3	2.1	1.5	1.0	1.7	2.0
2-3	1.8	1.9	2.2	1.8	1.3	1.8	1.8

	15	16	17	18	19	20	21
4-5	1.9	2.2	1.4	1.4	1.3	1.4	1.8
2-3	1.8	2.2	1.4	1.6	1.3	1.4	1.8

	22	23	24	25	Over-all Means (1-25)
4-5	2.0	2.3	1.6	1.7	1.7
2-3	1.9	1.9	1.5	1.8	1.8

[b] 4-5 year old middle class children vs.
2-3 year old middle class children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
Age	.8	1	.20	4.30
Error	4.1	22		
Within Subjects		576		
Observation	2.0	24	3.76	1.52
Interaction	.4	24	.78	1.52
Error	.5	528		

Table A-IX : Means and Analysis of Variance for Age[b] x Observation Interval on Program D

Mean Score for Visual Attention

Age	1	2	3	4	5	6	7
4-5	2.0	1.8	1.8	1.4	1.3	1.1	1.4
2-3	1.9	1.8	1.5	1.5	1.7	1.5	1.8

Age	8	9	10	11	12	13	14
4-5	1.9	1.6	2.0	1.5	1.8	1.3	1.7
2-3	2.0	1.7	1.8	1.7	1.9	1.8	1.9

Age	15	16	17	18	19	20	21
4-5	1.3	1.3	1.5	1.2	1.1	1.3	1.2
2-3	1.7	1.7	1.8	1.3	1.3	1.7	1.5

Age	22	23	24	25	Over-all Means (1-25)
4-5	1.6	1.6	2.1	1.4	1.5
2-3	1.7	1.9	1.8	1.7	1.7

[b] 4-5 year old middle class children vs.
2-3 year old middle class children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
Age	4.9	1	.79	4.30
Error	6.2	2		
Within Subjects		576		
Observation	1.1	24	2.36	1.52
Interaction	.3	24	.58	1.52
Error	.5	528		

Table A- X : Means and Analysis of Variance for Age[b] x Observation Interval on Program E

Mean Score for Visual Attention

Observation Interval

Age	1	2	3	4	5	6	7
4-5	1.6	1.2	1.3	1.7	1.3	1.8	1.2
2-3	2.0	2.0	1.9	1.9	1.6	2.4	1.7

	8	9	10	11	12	13	14
4-5	1.5	1.6	1.6	1.3	1.2	1.0	1.1
2-3	2.2	1.5	1.7	1.6	1.7	1.3	1.4

	15	16	17	18	19	20	21
4-5	1.3	1.3	1.8	1.7	1.8	1.5	1.7
2-3	2.0	2.0	1.7	1.8	1.9	2.1	2.1

	22	23	24	25	Over-all Means (1-25)
4-5	1.4	1.3	1.4	1.8	1.5
2-3	2.1	1.9	1.7	2.0	1.8

[b] 4-5 year old middle class children vs.
2-3 year old middle class children

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		23		
Age	22.4	1	4.03	4.30
Error	5.6	22		
Within Subjects		576		
Observation	1.1	24	2.54	1.52
Interaction	.4	24	.86	1.52
Error	.5	528		

Table A- XI : Means and Analysis of Variance for Sex[c] x Observation Interval on Program A

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.3	1.3	1.5	1.0	2.0	1.3	1.7
Girls	1.8	1.3	1.9	1.7	1.5	2.2	1.8

	8	9	10	11	12	13	14
Boys	1.8	1.7	2.0	1.8	1.7	2.2	1.7
Girls	1.3	1.3	1.5	1.8	2.0	1.7	1.7

	15	16	17	18	19	20	21
Boys	1.7	1.3	1.2	1.0	1.0	1.3	1.0
Girls	1.5	2.0	1.7	1.7	1.8	2.2	1.7

	22	23	24	25	Over-all Means (1-25)
Boys	1.0	1.3	1.7	1.0	1.5
Girls	1.7	1.8	1.7	1.8	1.7

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[c] 4-5 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	5.1	1	.84	4.96
Error	6.1	10		
Within Subjects		288		
Observation	.4	24	.81	1.56
Interaction	.7	24	1.38	1.56
Error	.5	240		

Table A-XII : Means and Analysis of Variance for
Sex[c] x Observation Interval on Program B

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.5	2.0	2.0	1.5	1.5	1.3	1.8
Girls	1.5	1.2	2.3	2.2	1.3	1.0	1.7

	8	9	10	11	12	13	14
Boys	1.8	2.2	2.2	2.3	2.0	1.5	2.0
Girls	2.2	2.2	1.8	1.2	1.5	1.2	1.7

	15	16	17	18	19	20	21
Boys	2.0	1.7	1.8	2.3	2.3	1.7	2.0
Girls	1.5	1.3	1.2	2.3	2.0	2.2	2.0

	22	23	24	25	Over-all Means (1-25)
Boys	2.0	1.8	1.7	1.3	1.9
Girls	1.5	1.3	1.0	1.0	1.6

[c] 4-5 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	4.6	1	1.09	4.96
Error	4.2	10		
Within Subjects		288		
Observation	1.2	24	2.23	1.56
Interaction	.5	24	.94	1.56
Error	.6	240		

Table A-XIII: Means and Analysis of Variance for Sex[c] x Observation Interval on Program C

Mean Score for Visual Attention

	Observation Interval																									
Sex	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Over-all Means (1-25)
Boys	1.2	1.5	2.0	1.8	3.0	2.0	1.3	2.3	1.0	2.7	1.7	1.0	2.2	2.2	2.2	2.5	1.3	1.5	1.5	1.8	1.5	2.2	2.2	1.5	1.3	1.8
Girls	1.3	1.7	1.7	1.5	1.7	2.0	1.5	1.5	1.5	1.5	1.3	1.0	1.2	1.8	1.7	1.8	1.5	1.3	1.2	1.0	2.2	1.8	2.5	1.7	2.0	1.6

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[c] 4-5 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	3.6	1	2.09	4.96
Error	1.7	10		
Within Subjects		288		
Observation	1.5	24	2.93	1.56
Interaction	.9	24	1.74	1.56
Error	.5	240		

Table A-XIV : Means and Analysis of Variance for Sex[c] x Observation Interval on Program D

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	2.2	2.0	1.8	1.5	1.3	1.2	1.3
Girls	1.8	1.7	1.7	1.3	1.3	1.0	1.5

	8	9	10	11	12	13	14
Boys	2.2	1.7	2.0	1.3	2.0	1.3	1.8
Girls	1.7	1.5	2.0	1.7	1.5	1.2	1.5

	15	16	17	18	19	20	21
Boys	1.5	1.2	1.5	1.3	1.0	1.3	1.3
Girls	1.2	1.5	1.5	1.0	1.2	1.3	1.0

	22	23	24	25	Over-all Means (1-25)
Boys	1.8	1.8	2.0	1.3	1.6
Girls	1.3	1.5	2.0	1.3	1.4

[c] 4-5 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	1.6	1	.57	4.96
Error	2.8	10		
Within Subjects		288		
Observation	1.0	24	1.99	1.56
Interaction	.2	24	.35	1.56
Error	.5	240		

Table A-XV : Means and Analysis of Variance for Sex[c] x Observation Interval on Program E

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.7	1.2	1.3	1.7	1.7	2.0	1.2
Girls	1.5	1.2	1.3	1.7	1.0	1.7	1.2

	8	9	10	11	12	13	14
Boys	1.2	1.5	1.3	1.2	1.2	1.0	1.2
Girls	1.8	1.7	1.8	1.3	1.2	1.0	1.0

	15	16	17	18	19	20	21
Boys	1.3	1.5	2.2	1.8	2.0	1.7	1.7
Girls	1.3	1.2	1.5	1.5	1.5	1.3	1.7

	22	23	24	25	Over-all Means (1-25)
Boys	1.5	1.3	1.7	1.8	1.5
Girls	1.3	1.3	1.2	1.7	1.4

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[c] 4-5 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	1.0	1	.64	4.30
Error	1.5	10		
Within Subjects		288		
Observation	.7	24	1.45	1.52
Interaction	.3	24	.63	1.52
Error	.5	240		

Table A-XVI : Means and Analysis of Variance for Sex[d] x Observation Interval on Program A

Mean Score for Visual Attention

	Observation Interval						
Sex	1	2	3	4	5	6	7
Boys	1.5	1.5	1.8	2.2	1.8	1.8	3.0
Girls	2.0	2.0	2.2	2.0	2.2	2.3	2.5
	8	9	10	11	12	13	14
Boys	2.2	2.0	2.3	2.5	2.7	2.7	2.0
Girls	2.3	2.3	2.0	2.2	2.2	1.5	2.2
	15	16	17	18	19	20	21
Boys	2.7	2.7	1.8	1.7	1.7	1.8	2.2
Girls	2.3	2.5	1.8	2.3	2.3	2.0	2.0
	22	23	24	25	Over-all Means (1-25)		
Boys	2.0	1.3	2.3	1.8	2.1		
Girls	2.0	1.8	2.0	2.0	2.1		

[d] 2-3 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	.1	1	.02	4.30
Error	7.1	10		
Within Subjects		288		
Observation	.9	24	1.61	1.52
Interaction	.6	24	1.10	1.52
Error	.5	240		

Table A-XVII: Means and Analysis of Variance for Sex[d] x Observation Interval on Program B

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	2.2	2.3	2.7	2.7	2.0	2.2	2.2
Girls	2.5	1.5	1.8	2.0	1.5	1.7	1.8

	8	9	10	11	12	13	14
Boys	2.2	2.5	2.3	2.3	2.0	1.8	2.3
Girls	2.0	2.2	2.5	2.3	2.5	2.3	2.3

	15	16	17	18	19	20	21
Boys	2.7	2.0	2.3	2.2	2.5	2.7	3.0
Girls	2.7	2.3	1.8	1.8	2.7	2.0	2.2

	22	23	24	25	Over-all Means (1-25)
Boys	2.7	2.2	1.5	1.3	2.3
Girls	2.0	2.2	1.8	1.7	2.1

[d] 2-3 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	2.4	1	.27	4.30
Error	8.9	10		
Within Subjects		288		
Observation	1.0	24	1.95	1.52
Interaction	.6	24	1.19	1.52
Error	.5	240		

Table A-XVIIE Means and Analysis of Variance for Sex[d] x Observation Interval on Program C

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.0	2.5	1.5	2.0	2.3	1.8	1.5
Girls	1.8	2.0	1.5	1.8	2.2	2.2	2.0

	8	9	10	11	12	13	14
Boys	1.5	1.7	2.0	1.7	1.2	1.8	1.5
Girls	2.2	2.2	2.3	2.0	1.5	1.8	2.0

	15	16	17	18	19	20	21
Boys	1.3	2.0	1.8	1.5	1.7	1.8	2.0
Girls	2.2	2.3	1.3	2.0	1.3	1.3	1.7

	22	23	24	25	Over-all Means (1-25)
Boys	2.5	2.2	1.7	2.2	1.8
Girls	1.3	2.0	1.7	1.8	1.9

[d] 2-3 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	.4	1	.06	4.30
Error	6.6	10		
Within Subjects		288		
Observation	.8	24	1.37	1.52
Interaction	.7	24	1.29	1.52
Error	.6	240		

Table A-XIX : Means and Analysis of Variance for Sex^{d} x Observation Interval on Program D

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.5	1.5	1.2	1.3	1.3	1.3	1.7
Girls	2.7	2.0	1.8	1.7	2.0	1.7	2.0

	8	9	10	11	12	13	14
Boys	2.0	1.5	1.8	1.7	1.8	2.0	2.0
Girls	2.0	1.8	1.8	1.7	2.0	1.7	1.5

	15	16	17	18	19	20	21
Boys	2.0	2.0	1.7	1.0	1.0	1.3	1,3
Girls	1.7	1.3	2.0	1.7	1.7	2.0	1.7

	22	23	24	25	Over-all Means (1-25)
Boys	1.7	2.2	2.0	1.7	1.6
Girls	1.7	1.7	1.7	1.7	1.8

[d] 2-3 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	2.4	1	.23	4.30
Error	10.5	10		
Within Subjects		288		
Observation	.4	24	.89	1.52
Interaction	.6	24	1.26	1.52
Error	.5	240		

Table A-XX : Means and Analysis of Variance for Sex[d] x Observation Interval on Program E

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	2.0	1.8	1.7	1.5	1.7	2.5	1.5
Girls	2.0	2.2	2.2	2.3	1.5	2.3	1.8

	8	9	10	11	12	13	14
Boys	2.2	1.2	1.7	1.2	1.3	1.0	1.0
Girls	2.2	1.8	1.7	2.0	2.0	1.5	1.8

	15	16	17	18	19	20	21
Boys	1.8	2.0	1.2	1.7	1.8	2.2	2.2
Girls	2.2	2.0	2.2	1.8	2.0	2.0	2.0

	22	23	24	25	Over-all Means (1-25)
Boys	1.8	1.8	1.7	2.0	1.7
Girls	2.3	2.0	1.7	2.0	2.0

[d] 2-3 year old middle class boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	6.2	1	.61	4.30
Error	10.0	10		
Within Subjects		288		
Observation	.9	24	1.88	1.52
Interaction	.4	24	.88	1.52
Error	.5	240		

Table A-XXI : Means and Analysis of Variance for Sex[e] x Observation Interval on Program A

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	2.0	1.5	1.8	2.2	1.7	2.0	2.0
Girls	1.7	1.7	2.7	2.7	2.5	2.0	2.0

	8	9	10	11	12	13	14
Boys	2.0	1.8	2.2	1.5	2.2	1.7	1.3
Girls	1.5	1.7	1.7	1.3	1.8	2.3	2.3

	15	16	17	18	19	20	21
Boys	1.5	2.2	2.3	2.3	2.5	2.2	1.3
Girls	1.5	1.7	1.5	1.5	1.2	1.3	1.7

	22	23	24	25	Over-all Means (1-25)
Boys	1.3	2.0	1.3	1.8	1.9
Girls	1.3	1.3	1.2	1.3	1.7

[e] 4-5 year old Mexican-American boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	1.3	1	.29	4.96
Error	4.6	10		
Within Subjects		288		
Observation	.9	24	1.55	1.56
Interaction	1.0	24	1.76	1.56
Error	.6	240		

Table A-XXII: Means and Analysis of Variance for Sex[e] x Observation Interval on Program B

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	2.5	2.2	2.2	2.8	1.8	2.0	2.3
Girls	1.7	2.0	1.7	2.0	1.7	1.2	1.7

	8	9	10	11	12	13	14
Boys	2.0	2.3	2.7	2.5	1.8	2.3	2.7
Girls	2.7	2.0	2.0	1.7	1.5	1.5	1.7

	15	16	17	18	19	20	21
Boys	2.8	2.3	2.2	2.7	2.7	2.2	1.8
Girls	1.7	1.3	2.2	2.3	2.7	2.0	2.5

	22	23	24	25	Over-all Means (1-25)
Boys	2.0	1.5	2.0	1.7	2.2
Girls	1.8	2.0	1.3	1.3	1.8

[e] 4-5 year old Mexican-American boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	12.0	1	1.61	4.96
Error	7.5	10		
Within Subjects		288		
Observation	1.0	24	1.86	1.56
Interaction	.8	24	1.37	1.56
Error	.6	240		

Table A-XXIII: Means and Analysis of Variance for Sex[e] x Observation Interval on Program C

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.5	1.7	1.7	1.8	3.0	2.5	2.2
Girls	1.3	2.5	1.7	2.0	2.3	2.2	2.2

	8	9	10	11	12	13	14
Boys	2.0	1.7	2.0	1.7	2.3	2.2	1.7
Girls	2.7	2.3	1.8	1.5	1.5	1.5	1.8

	15	16	17	18	19	20	21
Boys	1.7	2.0	1.7	2.0	2.0	2.2	2.2
Girls	1.8	1.5	1.7	1.3	1.5	1.8	1.8

	22	23	24	25	Over-all Means (1-25)
Boys	2.5	1.8	2.0	2.0	2.0
Girls	2.2	2.0	1.3	1.7	1.8

[e] 4-5 year old Mexican-American boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	1.8	1	.18	4.96
Error	9.9	10		
Within Subjects		288		
Observation	1.0	24	1.74	1.56
Interaction	.6	24	1.06	1.56
Error	.6	240		

Table A-XXIV: Means and Analysis of Variance for
Sex[e] x Observation Interval on Program D

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	2.3	1.5	2.0	2.0	2.0	1.7	1.7
Girls	2.3	1.8	1.7	1.3	1.8	2.0	2.3

	8	9	10	11	12	13	14
Boys	1.8	2.2	2.3	2.3	2.3	2.2	2.0
Girls	1.3	1.8	1.8	2.3	1.7	1.5	1.3

	15	16	17	18	19	20	21
Boys	1.7	2.0	1.7	1.7	2.0	1.8	2.2
Girls	2.2	2.0	1.5	1.3	1.3	1.0	1.7

	22	23	24	25	Over-all Means (1-25)
Boys	1.8	2.0	2.0	2.7	2.0
Girls	2.0	2.2	1.7	2.5	1.8

[e] 4-5 year old Mexican-American boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	3.4	1	.42	4.30
Error	8.1	10		
Within Subjects		288		
Observation	.9	24	1.50	1.52
Interaction	.5	24	.85	1.52
Error	.6	240		

Table A-XXV : Means and Analysis of Variance for Sex^e x Observation Interval on Program E

Mean Score for Visual Attention

Observation Interval

Sex	1	2	3	4	5	6	7
Boys	1.8	1.7	2.0	1.7	1.5	2.2	1.7
Girls	1.8	1.8	1.5	2.2	1.7	2.0	1.7

	8	9	10	11	12	13	14
Boys	2.2	2.3	2.3	2.2	2.2	1.8	1.5
Girls	1.3	1.8	1.7	1.8	1.5	1.7	1.3

	15	16	17	18	19	20	21
Boys	2.2	2.5	1.8	2.2	2.2	2.2	2.0
Girls	1.7	2.0	1.7	1.3	1.8	2.0	2.0

	22	23	24	25	Over-all Means (1-25)
Boys	2.0	1.8	2.0	1.7	2.0
Girls	2.3	2.5	2.2	1.8	1.8

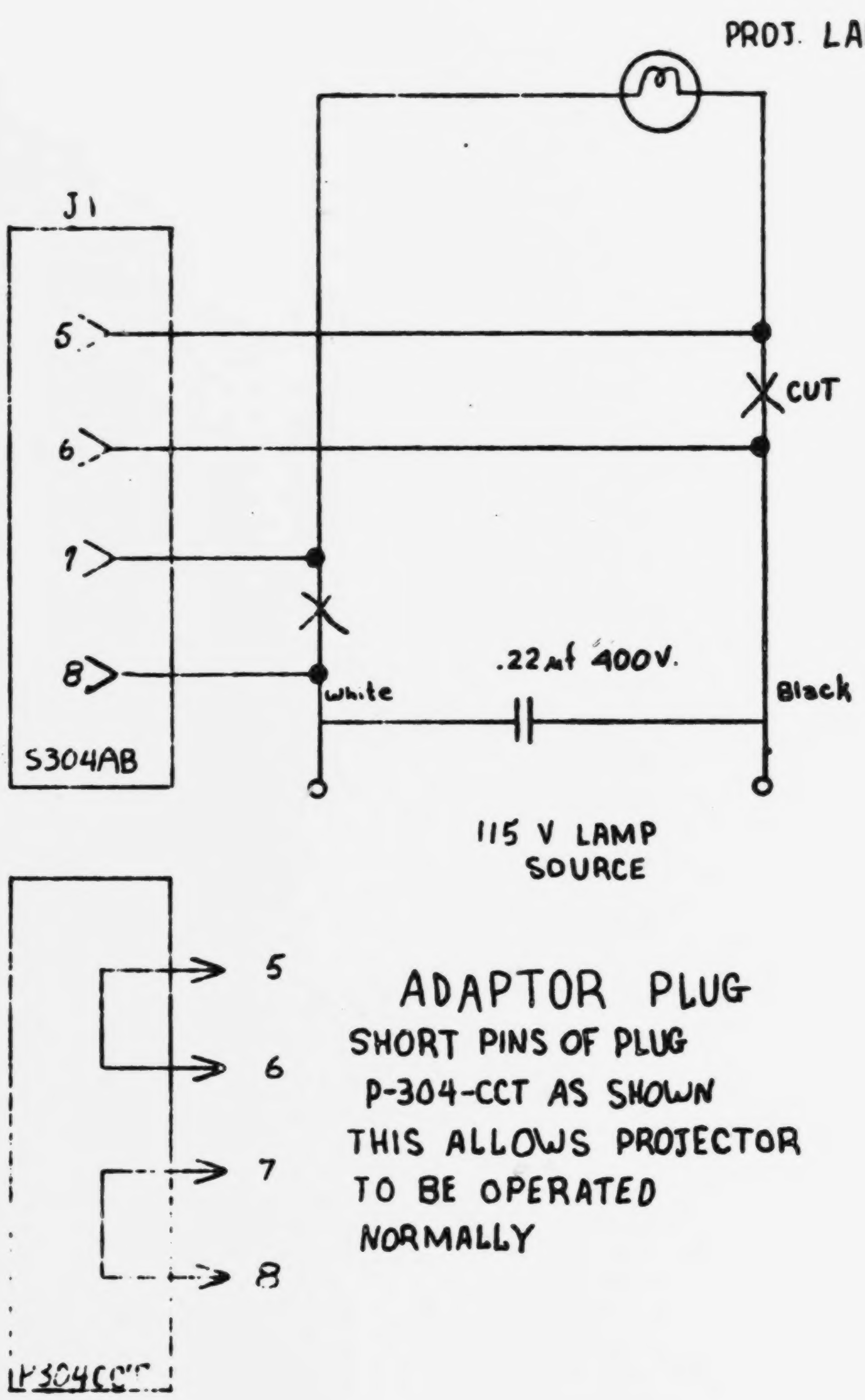
[e] 4-5 year old Mexican-American boys vs. girls

Analysis of Variance

Source	MS	df	F	$F_{.95}$
Between Subjects		11		
Sex	2.3	1	.24	4.96
Error	9.6	10		
Within Subjects		288		
Observation	.5	24	.94	1.56
Interaction	.5	24	.90	1.56
Error	.5	240		

APPENDIX B

Circuit Diagrams for Equipment

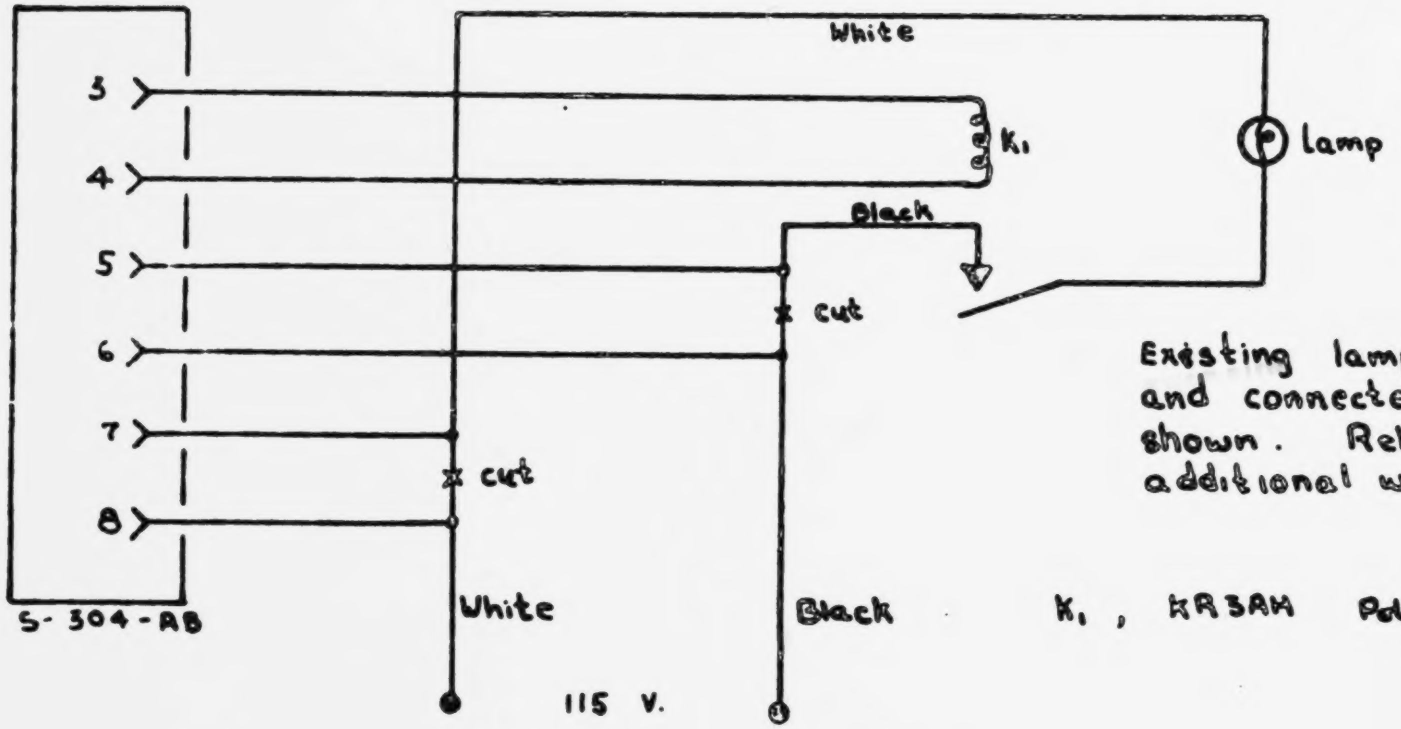

PROJ. LAMP
J1
5
6
7
8
S304AB
CUT
.22 µf 400V.
white
Black
115 V LAMP SOURCE
5
6
7
8
P304CCT

ADAPTOR PLUG

SHORT PINS OF PLUG
P-304-CCT AS SHOWN
THIS ALLOWS PROJECTOR
TO BE OPERATED
NORMALLY

EXISTING LAMP WIRES
ARE CUT AND CONNECTED
AS SHOWN TO CINCH JONES
SOCKET, P/N S-304-AB

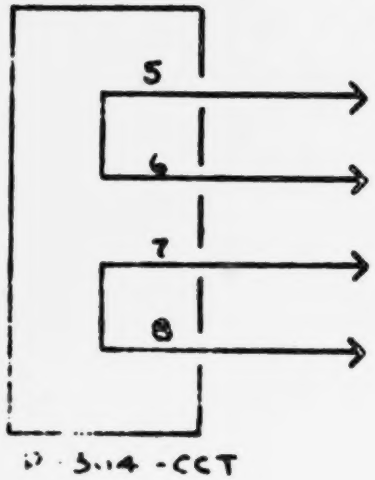
PROJECTOR MODIFICATION # 1


White
3
4
5
6
7
8
K1
lamp
Black
cut
cut
S-304-AB
White
Black
115 V.

Existing lamp wires are cut and connected to socket as shown. Relay K1 and additional wiring new.

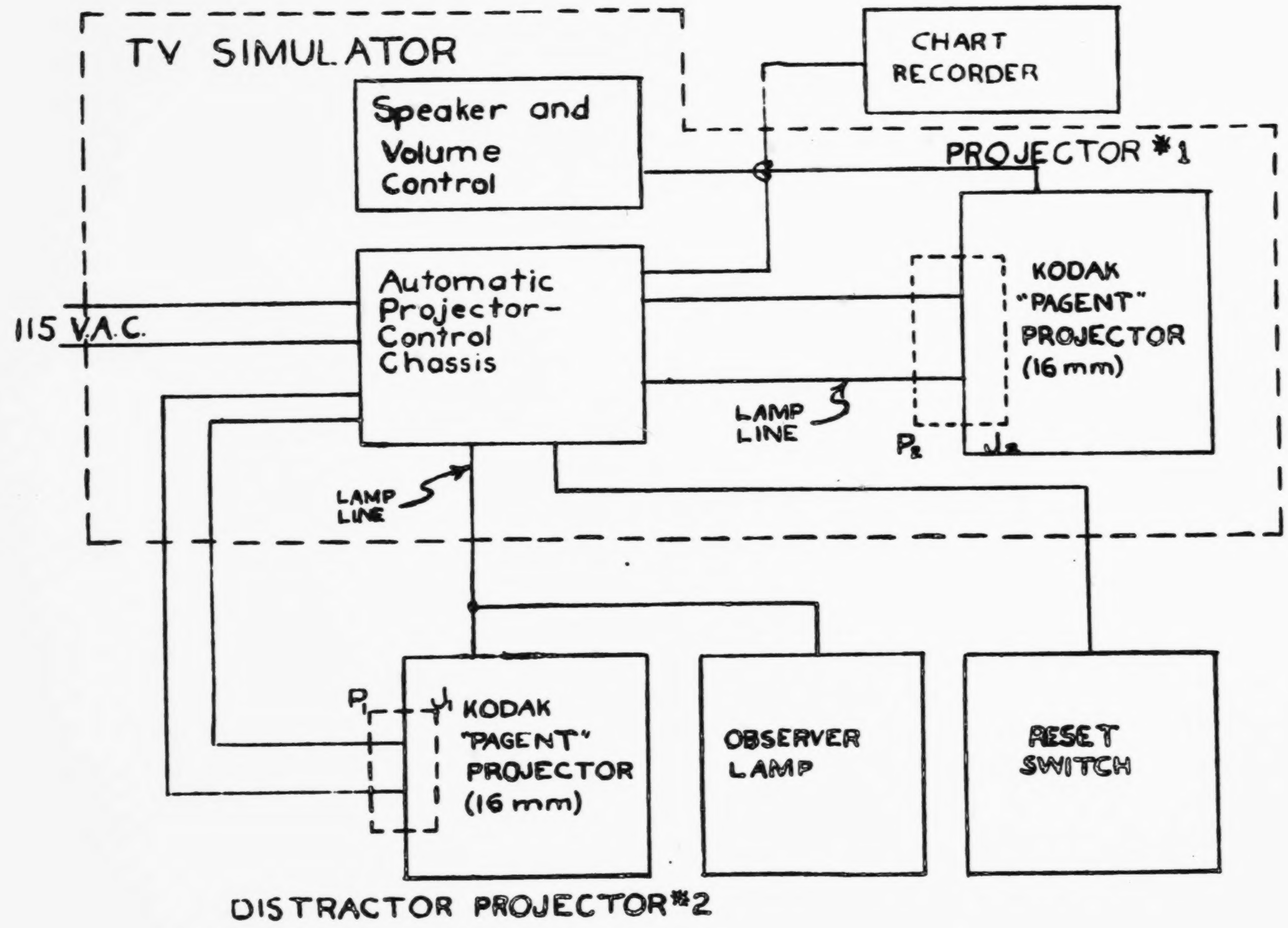
K1, KR3AH Potter + Brumfield

PROJECTOR MODIFICATION #2


5
6
7
8
P-304-CCT

ADAPTER PLUG

Short pins of plug as shown. This allows projector to be operated normally.


TV SIMULATOR
Speaker and Volume Control
Automatic Projector-Control Chassis
115 V.A.C.
LAMP LINE
CHART RECORDER
PROJECTOR #1
KODAK "PAGENT" PROJECTOR (16 mm)
LAMP LINE
P_2
J_2
P_1
J_1
KODAK "PAGENT" PROJECTOR (16 mm)
OBSERVER LAMP
RESET SWITCH
DISTRACTOR PROJECTOR #2

APPENDIX C

Identification and Description of the Five Main Program Segments used in Phase II

APPENDIX C

This appendix identifies and briefly describes each of the five main program segments used in Phase II. For convenience, all five program segments were reduced to approximately the same length, or to about 15 minutes.

Program Segment A is from the series produced in Memphis, Tennessee, entitled, "All Aboard with Mr. B." The particular segment used here was entitled, "Baseball". The content is as follows:

> The first half of this segment consists of a dream-fantasy sequence, in which Mr. B. is the sole individual to appear. In the "dream", Mr. B. is shown on an actual playing field, functioning alternately as pitcher, catcher, baseman, and even spectator. The only sound during this entire portion of the program is that provided by harmonica accompaniment of unusual aesthetic, rhythmic, and tonal quality. Portions of this dream sequence are shown in fast motion, and other portions in slow motion.
>
> In the second half of this segment, Mr. B. and a hand puppet in the form of a lion are shown talking to each other while creating a "cup-ball" game. In the course of creating this game, Mr. B. attaches a paper cup to the end of a short round stick, so that by grasping the stick, he can move the cup about in order to try to catch a ball. The ball is

attached to one end of a piece of string. The other end of this string is attached to the cup. Mr. B and the "lion" take turns trying to flip the ball into the air and catch it in the cup.

The opening and closing scenes of this program segment portray Mr. B, first as the engineer of a real train, waving to the viewers from the engine cabin, then as the engineer of a small, stylized studio train.

Program Segment B is from the series produced in Albuquerque, New Mexico, entitled, "TV Kindergarten."

This particular segment begins and ends with the performer sitting at the piano, playing and singing a song. This appears to be a standard opening and closing number. For the first 11 minutes following the brief opening, two small, black puppies are shown. The performer brushes, pets, feeds, and plays with them. She talks extensively about puppies and their various characteristics.

During the last few minutes, the performer reads a story about a dog. This is a fantasy in which the protagonist, a young child, has a dog which is larger than a house. As the performer reads the story, the camera alternately shows her face, the entire book, or the simple line drawings which appeared on each page of the book.

Program Segment C is from the series produced in Denver, Colorado, entitled, "Preparing Your Child for Reading."

This program was designed to help children in the earliest stages of learning to read. It was also apparently designed to foster parental participation in related activities. The particular segment used here stressed the identification of the letters of the alphabet and the association between the initial sounds and the initial letters in the names of various objects. The performer speaks alternately to the viewing parents and to the viewing children. From time to time, the performer appears in a picture in a corner of the screen and comments on an ongoing activity. Through this device, additional instructions are given to the parents or to the children.

This segment contains a number of family scenes. The opening shot shows a man and a young boy in a basement workshop. The man encourages the boy to find tools whose names begin with certain given sounds. In a later scene, a man, a woman, a young boy, and a young girl engage in similar activities while on a picnic. In addition to these scenes, there are others in which the performer identifies the letters which appear in miniature street signs, and encourages the children to listen for similar beginning sounds as various small toys are introduced and named.

Program Segment D is from the series produced in Pittsburg, Pennsylvania, entitled, "QED Kindergarten".

This segment begins with the female performer playing a piano and demonstrating some of the motions referred to in a simple song. The viewers are asked to clap loudly, then softly, to march, and to listen for the contrasting sounds of various simple musical instruments. A bell, a triangle, a tambourine, and a drum are shown and identified with their respective sounds. Then the sounds are presented alone, and the viewer is asked to quess which of the instruments is making it. After a brief pause, each instrument is then shown.

Program Segment E is from the series produced in Washington, D.C. entitled "Roundabout".

This program series was developed for the instruction of disadvantaged preschool children. The performer is a Negro male. The theme of the particular segment used here is that a pair is composed of two matching objects. In the opening scene, the performer is shown opening the mailbox outside his house, to find a parcel which contains only one sock. The concept of a pair is introduced through the performer's need for a pair of socks. Once the concept has been introduced, the performer emphasizes pairs of body parts, such as eyes, ears, nostrils, hands, etc., as well as parts which do not exist in pairs.

The last half of this program segment is concerned with a matching game which involves pairs of shoes, gloves, and stockings. Viewer participation in naming a painting of body parts is encouraged throughout.